EUGENE DIETZGEN CO.,
Drawing Materials and Surveying Instruments.
NEW YORK. CHICAGO. SAN FRANCISCO.

TABLES FOR EXCAVATIONS AND EMBANKMENTS.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 20 FEET WIDE. SIDE SLOPES 1 TO 1.
FOR SINGLE TRACK EXCAVATION.

"Copyright, 1902, by Eugene Dietzgen Co."

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	0
1	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	1
2	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	2
3	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	3
4	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	4
5	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	5
6	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	6
7	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	7
8	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	8
9	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	9
10	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	10
11	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	11
12	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	12
13	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	13
14	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	14
15	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	15
16	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	16
17	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	17
18	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	18
19	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	19
20	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	20
21	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	21
22	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	22
23	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	23
24	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	24
25	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	25
26	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	26
27	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	27
28	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	28
29	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	29
30	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	30
31	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	31
32	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	32
33	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	33
34	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	34
35	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	35
36	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	36
37	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	37
38	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	38
39	49.0	49.1	49.2	49.3	49.4	49.5	49.6	49.7	49.8	49.9	39
40	50.0	50.1	50.2	50.3	50.4	50.5	50.6	50.7	50.8	50.9	40

Calculated by F. E. Paradis, C. E.

50372

0383

Draw

New York.

TABLE

DISTANCES

	0
0	10.0
1	11.0
2	12.0
3	13.0
4	14.0
5	15.0
6	16.0
7	17.0
8	18.0
9	19.0
10	20.0
11	21.0
12	22.0
13	23.0
14	24.0
15	25.0
16	26.0
17	27.0
18	28.0
19	29.0
20	30.0
21	31.0
22	32.0
23	33.0
24	34.0
25	35.0
26	36.0
27	37.0
28	38.0
29	39.0
30	40.0
31	41.0
32	42.0
33	43.0
34	44.0
35	45.0
36	46.0
37	47.0
38	48.0
39	49.0
40	50.0

INDEX

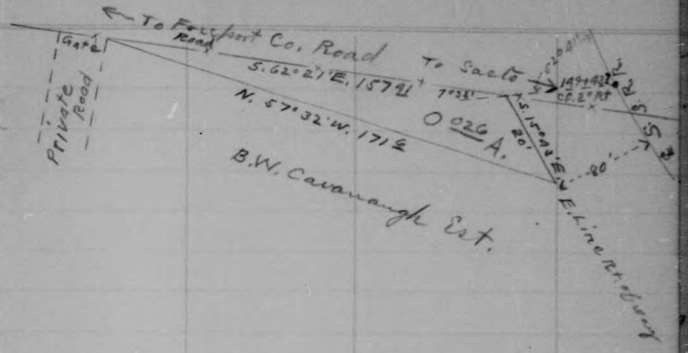
B. W. Cavanaugh Est. 149+60	2
Strip of Land on N. Side of Co. Road	
Miller Est. 41+ to 53+79^{5}	3.
Preliminary Line 0+00 to 13^{+536}	45
Comp. Curve. "A" 25+ to "E" 48+	47
"E" Line 6+52^{1} to 38+19^{2}	49
Comp Curve "E" 38+ to 25+71^{9}	50
"E" 38+ to Inst of Q St.	51
"E" 38+ to 43+37^{7}	52
"X" St	53
"W" St	54
"V" St	55
"U" St	56
"T" St	57
"S" St	58
R St	59
"E" & "T" Lines	64
Knox's Spur	65
"A" Line	66
"Y" on "R" St	70
Placerville Branch	71
Traverse of R.W. & Station	
Grounds sought from	
~~R.W. Sharp. Walnut Grove~~	~~8~~
" " " " " (Corrected)	13
Acreage to be Leased in	69
Block 20, Brannan's Add^{n}	
House Track. (Walnut Grove)	9
" " (F. W. Ehrhardt.)	10

0384

House Track (Franklin Road) Page 11 + 12 (All traverses and explanatory dia-
" " (" ") grams relating to the Map of the Water
East of HOOD. Page 14. Front from page 49 on.
R.W. North of Hood $25^{\underline{0}}$ Strip. $50^{\underline{0}}$ Rt. Opp D716+00 + Opp D 718+78^{5} Page 14.
R.W. conveyed by S.P.Co., to S.S.R.R. thro' ppty formerly owned by P.J. Van Loben Sels p. 15
Property Corner Common to W.H. Mosher. Driver + Shriner, John Elliot and Nicolaus Estate
1/4 Cor Secs. 35, 36 T. 7 N. R 4 E. P. 17.
Property line between Driver & Shriner and John Elliot p 18
" " " " " " " " Resurvey p. 19
Traverse of Land. Containing 4.018 Acs. belonging to John Elliott p 19.
" " Additional R.W. from F.W. Ehrhardt p 16
Alignment "D" + "T" Lines p 67
Traverse of Portion of R. of W. through Vincent Glann Estate. Void. " 22
Traverse to Determine the intesection of the South Boundary of Swamp Land
Survey #1000 with the Center Line of Sacramento Southern Railroad. Pages 20-21.
Traverse of Portion of Swamp Land Survey 1000 East of ℄ of S.S.R.R. Page 25.
Traverse of Portion of R. of W. through Vincent Glann Estate. " 26
" Cavanaugh property obtained to widen Co. Road at "E" 149+ 2
" for deed from the Miller heirs, Sta. 41+ to 53+ 3
" of property sought from R.W. Sharps Walnut Grove. (see 13) 8.
" " N. connection for house track at Walnut Grove. 9.
" " House Track through Ehrhardt property 10
" " " at Franklin Road. 11-12.
" " Right of Way obtained from A. Brown (formerly R.W. Sharp prop.) 13
" " " " " " additional from Ehrhardt, "D" 906+19^{85} to 916+19^{85} 16
" " " " " " from V. Glann Estate 26
" " property " " D. Bixler 27
Alignment, "E" 637+$07^{\underline{9}}$ through "D" + "T" Lines to "E" 1420+45^{5} E.C. 67

B.W. Cavanaugh Est. 6/17/07

Strip of Land on N. side County Road (149+60) 7
from E. line Rt. of way to Gate.



Course	Dist.	Lat		Dep	
		N	S	E	W
S. 62° 21' E.	157^{41}		73.049	139.434	
N. 57° 32' W.	171^{6}	92.117			144.779
S. 15° 43' E.	20^{0}		19.252	5.418	
		92.117	92.301 .117 .184	144.852 .779 .073	144.779

Traverse. For Deed From the Miller Heirs
From opp Sta 41+766 to opp Sta 53+795

Sta	Angle Lt	Rt	Dist	Bearing	N	S	E	W
			$241^{\underline{5}}$	S 0°17½' W	—	241.5	—	1.23
			$493^{\underline{4}}$	S 1°14½' E	—	493.28	10.69	—
			$259^{\underline{7}}$	S 2°07½' E	—	259.52	9.63	—
			$223^{\underline{0}}$	S 3°20½' E	—	222.62	13.00	—
			$26^{\underline{17}}$	S 89°33' E	—	0.21	26.17	—
			$490^{\underline{12}}$	N 2°42' W	489.58	—	—	23.09
			$553^{\underline{0}}$	N 1°28' W	552.82	—	—	14.16
			$158^{\underline{3}}$	N 1°02' W	158.27	—	—	2.85
			$24^{\underline{84}}$	N 49°04' W	16.27	—	—	18.77
					1216.94	1217.13	59.49	60.10
						1216.94		59.49
						0.19		0.61

Traverse of Right of Way Sought from R.W. Sharp, Walnut Grove.

Sta	Dist	Lt	Rt	Bearing	N.	S.	W.	E.
	115^{0}			S.62°12' E.	—	53.63	—	101.73
	454^{0}			N-26°13'E	407.30	—	—	200.56
	79^{5}			N 59°58'W	39.79	—	68.83	—
	165^{0}			S 30°21'W	—	142.39	83.37	—
	24^{05}			N 59°58'W	12.04	—	20.82	—
	293^{2}			S 26°13'W	—	263.04	129.53	—
					459.13	459.06	302.55	302.29
					459.06		302.29	
					0.07		0.26	

Traverse of Station Grounds Sought from R W Sharp, Walnut Grove

Sta	Dist	Lt	Rt.	Bearing	N.	S.	W.	E.
	62^{0}			S·62°12'E		28.92		54.84
	293^{2}			N 26°13'E	263.04			129.53
	62^{0}			N·59°58'W	31.03		53.68	
	295^{6}			S·26°13'W		265.19	130.58	
					294.07	294.11	184.26	184.37
						294.07		184.26
						0.04		0.11

0388

Traverse of North Connection for House Track at Walnut Grove

		N	S	E	W
122.28	N 5°44'E	121.7		12.2	
79.18	N 2°34'E	79.10		3.55	
		200.80		15.75	

Traverse to B.C. of House Track

		N	S	E	W
122.28	N 5°44'E	121.70	—	12.20	—
539.36	N 2°34'E	538.82		24.15	
		660.52		36.35	

Traverse to E.C. of House Track

		N	S	E	W
122.28	N5°44'E	121.70	—	12.20	—
603.53	N 2°34'E	602.93	—	27.03	—
64.17	North	64.17	—	—	—
		788.80		39.23	
				4.71	
				43.94	

Note: Actual distance measured in the field 788^{89} ft from Point of Frog to point on E' Line opp. 2° curve T.C. 2°34' and through tie between E.C. and point on E' Line 44 feet. By traverse 788.80 and 43.94 ft

Traverse of House Track Through F.W. Ehrhardt.

Slope 2:1 Main Line. Embankment.

	Dist	Courses.	N	S	E	W.	
"D"909+11^{94}	4^{71}	East.			4.71		
B.C	12^{0}	56°22'E		11.93	1.33.		F.Pt. - B.C.
				11.93	6.04		
"D"909+11^{94}	4^{71}	East			4.71		
P.I.	85^{34}	56°22'E		84.81	9.46		F.Pt.-P.I.
				84.81	14.17		
D909+11^{94}	4.71	East			4^{71}		
P.I	85^{34}	56°22'E		84.81	9.46		F.Pt.-E.C.
E.C.	73^{34}	53°26'E		73.21	4.39		
				158.02	18.56		
D909+11^{94}	4.71	East			4.71		
P.I.	85^{34}	56°22'E		84.81	9.46		F.Pt.-B.C.#2
B.C.	584^{9}	53°26'E		583.85	35.03		
				668.66	49.20		
D909+11^{94}	4.71	East			4.71		
P.I.	85^{34}	56°22'E		84.81	9.46		
P.I.	670^{76}	53°26'E		669.56	40.17		F.Pt.-E.C.#2
E.C.	85^{86}	South		85.56			
				840.23	54.34		
D909+11^{94}	4.71	East			4.71		
P.I.	85^{34}	56°22'E		84.81	9.46		F.Pt - P.I.#2
P.I.	670^{76}	53°26'E		669.56	40.17		
				754.37	54.34		

0390

Traverse of North End of House Track at Franklin Road Xing.

on S.P. Property.

Bear.	Dist.	N	S	E	W	
						~~R of 0°30' + 59°.~~
~~N86°15½'E~~	~~11518.17~~	~~751.56~~	~~–~~	~~11493.64~~		
~~West~~	~~11476.67~~	~~–~~	~~–~~	~~–~~	~~11476.67~~	~~R of 0°30' + $17^{\underline{5}}$ Fg. Pt.~~
~~S6°22'W~~	~~$120^{\underline{o}}$~~	~~–~~	~~119.26~~	~~–~~	~~13.31~~	~~P.I.~~
~~S1°52½'W~~	~~458.79~~	~~–~~	~~458.55~~	~~–~~	~~15.01~~	~~P.I.~~
~~S3°44½'E~~	~~174.19~~	~~–~~	~~173.80~~	~~11.37~~	~~–~~	~~Δ59° Rt opp. D753.31$^{\underline{0}}$ E.C. 0°30'~~
		~~751.56~~	~~751.61~~	~~11505.01~~	~~11504.99~~	
			~~751.56~~	~~11504.99~~		
			~~.05~~	~~.02~~		

Traverse of South End of House Track South of Franklin Road.

D774+$88^{\underline{66}}$ Fg.Pt.		N	S	E	W.	
West.	17.71				17.71	Fg.Pt. to P.I. #1.
N6°22'W	$85^{\underline{34}}$	84.81			9.46	(For B.C + E.C. See p.10)
		84.81			27.17	
West	17.71				17.71	
N6°22'W	$85^{\underline{34}}$	84.81			9.46	Fg.Pt. to P.I. #2
N3°26'W	531.$\underline{38}$	530.56			31.82	
		615.37			58.99=59.00	

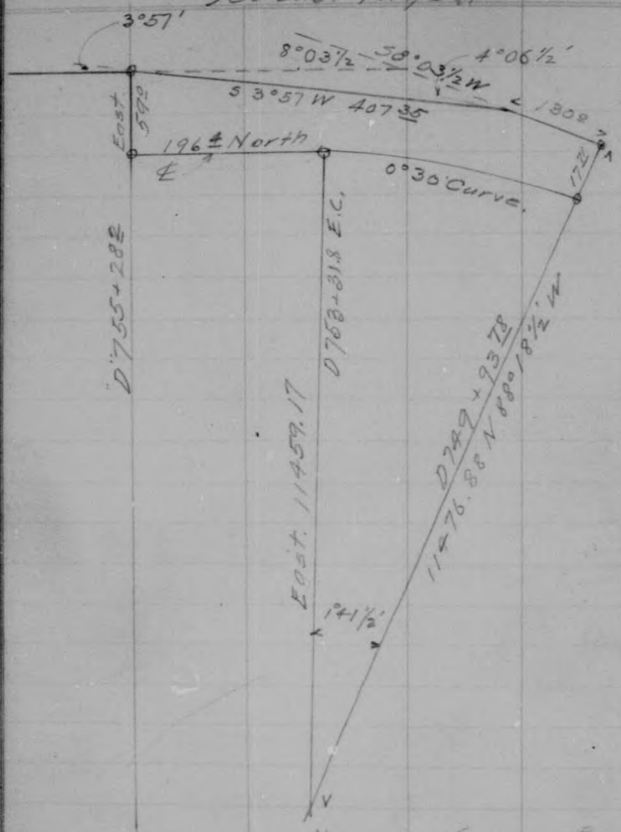
Traverse of North End of House Track South of Franklin Road.

"D"749+$93^{\underline{28}}$ Fg.Pt.		N	S	E	W.	
West	17.71				17.71	
S6°22'W.	130.00		129.20		14.42	F.Pt. to P.I. #1.
			129.20		32.13	
West	17.71				17.71	
S6°22'W	130.00		129.20		14.42	Fg.Pt. to P.I. #2
S1°41½E	407.35		407.17	12.02		
			536.37	12.02	32.13	
					-12.02	
					20.11	

See Next. Page

House Track, North End South of Franklin Road.

See Last Page 11



		N	S	E	W.
East	59.0			59.00	
North	196.4	196.4			
East	11459.17			11459.17	
N88°18½W	11476.88	338.85			11471.89.
S8°03½W	130.0		128.72		18.22
S3°57'W	407.35		406.53		28.06
		535.25	535.25 535.25 00	11518.17	11518.17 11518.17 .00

Traverse of R.W. obtained from A. Brown formally R.W. Sharp (in Condemnation).

Dist.	Bear	N	S	E	W.
79.5	N60°15'W ~~N59°58'W~~	39.79 ✓	—	—	68.83 ✓
165.0	S30°04'W ~~S30°21'W~~	—	142.39 ✓	—	83.37 ✓
86.1	N60°15'W ~~N59°58'W~~	43.09 ✓	—	—	74.54 ✓
295.6	S25°56'W S ~~26°13~~ W	—	265.19 ✓	—	130.59 ✓
227.1	S62°29'W [illegible]	—	105.92 ✓	200.89 ✓	—
452.04	N25°56'E ~~N26°13'E~~	405.54 ✓	—	199.70 ✓	—
50.1	N60°15'W ~~N59°58'W~~	25.08	—	—	48.27 ✓
		513.50	513.50	400.59	400.70 400.59 .11

Note; Traversed figured by crossed out bearings. Other Bearings being the corrected bearings

S25°56'W bearing of ℄ S.S.R.R. instead of S26°13'W. as used in Traverse.

Containing 2.04± Acres.

House Track at Franklin Road East of "Hood."

Dist.	Course	N	S	E	W.
1752.31	North.	1752.31			
17^{71}	West.				17.71
109^{72}	S6°22'W.		109.04		12.17
564.6	S2°33'W.		564.49		25.12
739.24	South		739.24		
488.89.	S3°19½E		488.07	28.35	
148.22	S9°18¼E		146.27	23.96	
17^{71}	N87°03¾E	.91		17.69	
293.81	N2°56¼W.	293.43			15.05
		2046.65	2047.11	70.00	70.05
			2046.65		70.00
			.45		.05

R.W. North of Hood. 25° Strip

50° opp D 716+00 - opp. D 718+78^{5}

Dist.	Course	N	S	E	W	Double Long.	N+ Double Area.	S-
268^{4}	N 2°20½E	268.17		10.97		10.97	2941.82	
25^{0}	N87°39½'W	1.02			24.98	- 3.04		3.10
263^{3}	S2°20½E		263.08		10.76	- 38.78	10202.24	
25^{49}	S76°12½E		6.08	24.75		- 24.79.	150.72	
		269.19	269.16	35.72	35.74		13294.78	3.10
		269.16			35.72		3.10	
		.03			.02			

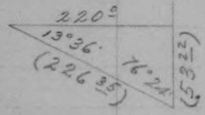
2) 13291.68

43560) 6645.84

0.1525 acres

Right of Way conveyed by S.P.Co. to Sacramento Southern Railroad through property formerly owned by P.J. Van Loben Sels, in S.L.S. #1000

Distance	Course	North	South	East	West
226^{35}	S 50°35½E		143.70	174.89	
878^{74}	S 25°48½W		791.10		382.57
245^{52}	N 9°00'E	242.51		38.41	
159^{3}	N 43°29'W	115.58			109.62
640^{6}	N 25°48½E	576.71		278.89	
		934.80	934.80	492.19	492.19



89°60'
76°24
13°36

220.0 = 2.342423
13°36' = 9.987649
2.354774 = 226^{35}

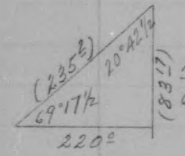
220° = 2.342423
13°36 = 9.383682
11.726105 = $53^{22.4}$

1115+44.3
1109+03.7
640^{6}

640^{6}
53^{22}
587.38

587.38
83.17
670.55

670.55
208.19
878.74

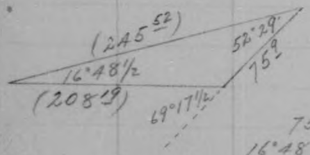


179°60'
110°42½
69°17½

89°60
69°17½
20°42½

220° = 2.342423
20°42½ = 9.970994
2.371429 = 235^{2}

220° = 2.342423
20°42½ = 9.577532
11.919955 = 83^{168}



N 43°29'W
N 9°00'E
52°29

110°42½
52°29
163°11½

179°60
163°11½
16°48½

16°48½
52°29
69°17½

235.2
159.3
75.9

75.9 = 1.880242
16°48½ = 0.538845
69°17½ = 9.970994
2.390081 = 245^{52}

75.9 = 1.880242
16°48½ = 0.538845
52°29 = 9.899370
2.318457 = 208^{19}

F.W. Ehrhardt Addition R.W. Just South of Dutch Flat Road.

Opp "D" $906+19^{\underline{85}}$ to Opp "D" $916+19^{\underline{85}}$

Distance	Course.	N	S	E	W
$1009^{\underline{40}}$	S7°27½E		1000.86	131.03	
$150^{\underline{0}}$	S82°32½W		19.47		148.73
$1029^{\underline{55}}$	N7°27½W.	1020.84			133.65
$151^{\underline{35}}$	N89°47½E	.55		151.35	
		1021.39	1020.33	282.38	282.38
		1020.33			
		1.06			

0396

Traverse to Locate property Corner common to, W.H. Mosher, Driver & Shriner, John Elliot, and Nicolous Estate. 1/4 Cor. 35.36 T.7N.R4E.

Course.	Dist.	N	S	E	W.
N1°01'E	2666.20	2665.760		47.32	
N89°45¾'W	127.0	.53			127.000
S0°20'W	2665.74		2665.687		15.515
S89°35'E	95.2		.692	95.197	
		2666.290	2666.379	142.517	142.515
			2666.290	142.515	
			.089	.002	

Traverse to locate property Line between Driver & Shriner and John Elliot.

Sta. 617+70^{2} ∡ 98°49' Lt looking ahead on Line Thence:

Course	Dist	N	S	E	W.
S88°25'E	630°	—	17.41	629.71	—
N1°35'E	832°	831.69	—	22.99	—
N10°29'E	4000°	3933.24	—	728.80	
N29°41'E	1494°	1297.96	—	739.84	—
N89°35'W	112.1	.81	—	—	112.10
S33°43'W	1761.2		1464.95		977.62
S10°24'W.	4697.6		4620.42		848.01
		6063.70	6102.78	2221.34	1937.73
			6063.70	1937.73	
		Diff =	39.08	283.61	

Tying to Tang. prod. back 431^{5} ft. from 557+54^{1} E.C.

CORRECTED. TRAVERSE

Sta. 617+70^{2} as above.

Course	Dist.	N	S	E	W.
S88°25'E	620°	—	17.13	619.80	—
North	830°	830.00	—	—	—
N8°54'E	4000°	3951.84	—	618.84	—
N27°56'E	1494°	1319.91	—	699.86	—
N89°35'W	112.1	.81	—	—	112.10
S33°43'W	1761.2	—	1464.95	—	977.62
S10°24'W	4697.6	—	4620.42	—	848.01
		6102.56	6102.50	1938.50	1937.73
		6102.50		1937.73	
		.06	Diff	.77	diff.

Note. For Resurvey and balanced Traverse see next Page.

Traverse to Calc. Tie Line and Bearing to locate ppty Line between Driver & Shriner and John Elliot

Course	Dist	N	S	E	W
N33°43'E	1450.0	1206.10	—	804.88	—
S89°35'E	112.1	—	.81	112.10	—
S27°56'W	—	—	1319.91	—	699.86
		1206.10	1320.72 1206.10 114.62	916.98 699.86 217.12	699.86

$\frac{114.62}{217.12}$ = Tang. 62°10' or S62°10'E bearing of the line of 245^{5}±

Traverse of Property Line between John Elliott and Driver & Schreiner.

Containing 550~~44~~± Acres.

Distance.	Bearing.	+ N	− S	+ E	− W	Double Long.	Double N +	Areas. S −
1774.46	S33°43'W	—	1475.78 ~~1475.98~~	—	985.33 ~~984.99~~	2683.17		3959768.6
4697.6	S10°24'W.	—	4619.87 ~~4620.42~~	—	848.92 ~~848.07~~	× 848.92		3921900.0
631.8	S88°25'E	—	17.39 ~~17.46~~	631.44 ~~631.56~~	—	631.44		10980.7
840.1	North	840.1	—	—	—	1262.88	1,060,945.4	
4000.0	N8°54'E	3952.34 ~~3951.84~~	—	618.07 ~~618.84~~	—	1880.95	7434153.9	
1494.0	N27°56'E	1320.13 ~~1319.93~~	—	699.56 ~~699.85~~	—	3198.58	4222541.4	
114.8	N89°46'W.	0.47 ~~0.46~~	—	—	114.82 ~~114.80~~	3783.32	1778.2	
		6113.04	6113.04	1949.07	1949.07		12719418.9	7892649.3

7892649.3

4826769.6 ÷2÷43560 =55.403 Acre

Tract East of above Property Line at North End. John Elliott.

Traverse of Survey and balanced Containing. 4.018± Acres.

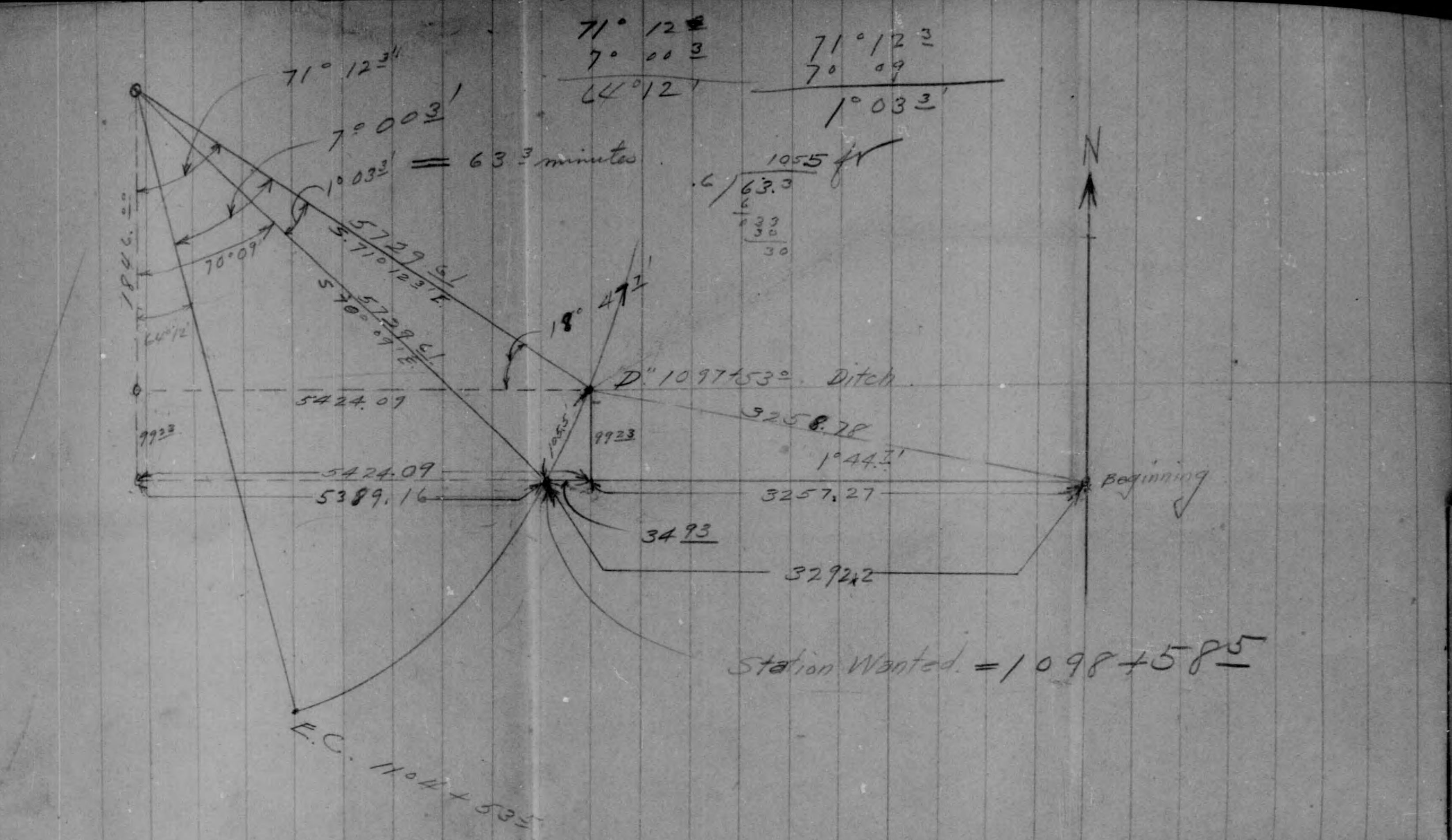
Dist.	Bear.	+ N	− S	+ E	− W			
1494.0	S27°56'W.	—	1320.13 ~~1319.91~~	—	699.56 ~~699.86~~	− 699.56		923510.14
124.62	S8°54'W	—	123.18 ~~123.12~~	—	19.20 ~~19.28~~	− 1418.32		174708.66
1710.45	N32°28'E	1443.50 ~~1443.11~~	—	918.76 ~~918.19~~	—	− 518.76	748311.30	
200.0	N89°46'W	0.81	—	—	200.00	+ 200.0		162.00
		1443.31	1443.31	918.76	918.76		748311.30	1098380.80

748311.30

2) 350069.50

43560) 175034.75

4.018 Ac.

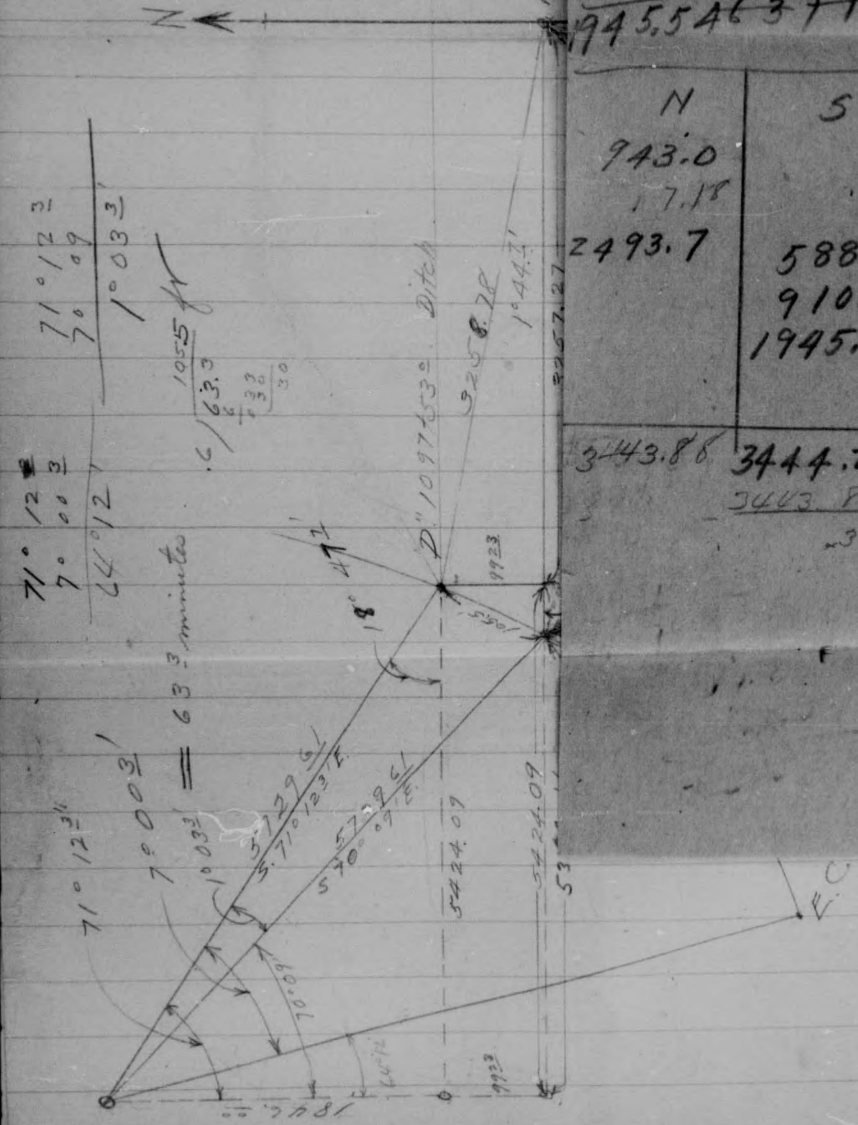


Station Wanted. = 1098+58.5

71° 12¾
7° 00¾
64°12'

71°12¾
7° 09
1°03¾'

.6)63.3
105.5 ft



S70°09E
5729.61

cos
5729.61
.33956
3437766
2864805
5156649
1718883
1718883
1945.5463716

sin
5729.61
.94058
4583688
2864805
2291844
5156649
5389.1565738

N	S	E	W
943.0 17.18 2493.7	588.02 910.63 1945.55	5389.16	667.51 2415.16 440.21 5158.48
3443.86	3444.20 3443.88 .32	5389.16	8681.36 5389.16 3292.2

3257.27
34.93

#1000

Traverse to Determine the Intersection of the South Boundary of Swamp Land Survey, with the Center Line of the Sacramento Southern Railroad.

Distance	∡ Lt.	∡ Rt.	Bearing	$\overset{+}{\text{N}}$.	$\overset{-}{\text{S}}$.	$\overset{+}{\text{E}}$.	$\overset{-}{\text{W}}$.
943.0	—	—	North	943.0	—	—	—
667.55	89° 23'	—	N. 89° 23' W.	7.18	—	—	667.51
2485.7	14° 18'	—	S. 76° 19' W.	—	588.02	—	2415.16
1011.45	50° 31'	—	S. 25° 48' W.	—	910.63	—	440.21
5729.61	—	90° 00'	N. 64° 12' W.	2493.70	—	—	5158.48
5729.61	—	172° 59.7'	S. 71° 12.3' E.	—	1846.00	5424.09	—
				3443.88 3344.65 99.23	3344.65	5424.09	8681.36 5424.09 -3257.27
3258.78			S. 88° 15.3' E.				

Note See Page 20. for Sketch and Computations.

0402

Traverse of Portion of Right of Way Through Property of Vincent Glann Estate.

Beginning at a Point (69°26' from tangent of 1°00' Curve, at Sta. "D." 1099+29^{3}), 96.02 ft. West of ℄

Station	Distance	∠ Lt.	∠ Rt	Bearing	+ N.	− S.	+ E.	− W	Double Longitude	Double N−	Areas S+
	653.3			West	0.0	0.0		653.3	−653.30	0.00	0.00
"M^{3}" 9+71^{3}		84°05'									
	36.5			S.5°55'W.		36.31		3.76	−1310.36		47,579.17
"M^{3}" 9+34^{8}			12°04'								
	299.9			S.17°59'W.		284.69 ~~285.25~~		92.16 ~~92.59~~	−1406.28		400,353.85
"M^{3}" 6+34^{9}		24°12'									
	207.4			S.6°13'E.		206.08 ~~206.18~~	22.46		−1475.98		304,169.96
"M^{3}" 4+27^{5}		21°10½'									
	259.3			S.27°23½'E.		230.00 ~~230.23~~	119.30		−1334.22		306,870.60
"M^{3}" 1+68^{2}		13°51'									
	168.2			S.41°14½'E.		126.48	110.89		−1104.03		139,637.71
"M^{3}" 0+00 "T" 1107+94^{9} "M^{4}" 0+00		7°47'									
	93.3			S.49°01½'E.		61.18	70.44		−922.70		56,450.79
"M^{4}" 0+93^{3}		105°10½'									
	470.7			N.25°48'E.	423.78		204.86		−647.40	274,355.17	
Opp. "D" 1104+53^{45} E.C. 1°00'.		2°47¼'									
	566.0			N.23°00¾'E.	520.96		221.27		−221.27	115,272.82	
∆ of Beginning		113°01¼'									
	2754.6	372°04½'	12°04'		944.74	945.63 944.74	749.22	749.65 749.22		389,627.99	1,255,062.08 389,627.99
		12°04'									
		360°00½'				.89		.43			2) 865,434.09
											432,717.05
						Corrected 944.74	Corrected	749.22			1,947.04
										43560	) 434,664.09
											9.98 Acs.

Void

$$\frac{\sqrt{.89^2+.43^2}}{2754.6} = \frac{3588}{10,000,000} =$$ Rate of Error in Chaining.

Area between long chord of R.W. curve, and 90ft. R.W. line 1°00' Curve, and ∆ on South Line of S.L.S. 1000 of Sacramento Southern Railroad. = 566.^{12} ft.

Length of Arc on 90ft. R.W. line between Opp. "D" 1104+53^{45} E.C., Opp. Sta. "D" 1099+29^{3} and 96^{02} ft. east of Center Line

Traverse tract on Snodgrass Slough, beginning at iron pipe at center of Sect. 14.

Point.	Distance	∠ Left.	∠ Right.	Bearing	Latitude		Departure.		Total Latitude		Total Departure.	
					N.	S.	E.	W.	N.	S.	E.	W.
Pipe at Center Sec. 14.												
Iron Pipe	2117^{0}											
Stake	224^{0}											
	670^{0}			N37°45'W	529^{76}			410^{19}				
Stake	175^{0}			N37°45'W	138^{37}			107^{14}				
	354^{0}			N10°51'E	347^{67}		66^{64}					
	897^{0}			N7°33'W	889^{22}			117^{86}				
△	748^{0}			N22°17'W	692^{14}			283^{63}				
	85^{0}			N56°33'W	46^{85}			70^{92}				
	519^{0}			N82°45'W	65^{50}			514^{85}				
△	81^{0}			N55°04'W	46^{38}			66^{41}				
	452^{0}			N36°30'E	363^{34}		268^{86}					
△	730^{0}			S64°17'E		316^{76}	657^{69}					
	2265^{0}			S16°45'E		2168^{90}	652^{76}					
△	475^{0}			S79°30'W		86^{56}		467^{05}				

					Latitude		Departure		Total Latitude		Total Departure	
Point.	Dist.	ΔLeft	ΔRight.	Bearing	N.	S.	E.	W.	N.	S.	E.	W.
Stake												
	812^{0}			S37°49'E		641^{46}	497^{87}					
△	421^{0}			S 39°19'E		325^{71}	266^{75}					
	75^{0}			S 39°19'E		58^{02}	47^{52}					
	317^{0}			S 60°33'E		155^{86}	276^{04}					
△	622^{0}			S66°08'E		251^{67}	568^{81}					
	153^{0}			S23°29'E		140^{33}	60^{97}					
	589 589^{0}			S3°42'W.		587^{77}		38^{01}				
Iron Pipe.	400^{0}			S80°19'E		67^{40}	394^{28}					
Iron Pipe	900^{0}			N4°00'W	897^{81}			62^{78}				
	1350 1360^{0}			N59°30'W	698^{25}			1171^{82}				
△	375^{0}			S 8°30'W.		370^{88}		55^{43}				

0405

Traverse of Portion of Swamp Land Survey 1000 East of Center Line of the Sacramento Southern Railroad.

Station	Dist.	Bearing	+	−	+	−	Double longitude	Double Areas.	
			N.	S.	E.	W.		+ N.	− S.
"D."1098+59^{0}	3292.20	East	—	—	3292.20	—	14070.20	0.00	—
	3161.75	North.	3161.34 ~~3161.75~~	—	—	—	17362.40	54,888,449.62	—
	3063.80	N.89° 45'W.	13.36	—	—	3063.54 ~~3063.77~~	14298.86	191,032.77	—
To "D"1066+38^{5}									
	489.10	S.7° 27½'E.	—	484.96	63.48	—	11298.80	—	5,479,466.05
B.C. 1° Curve "D"1071+27^{6}	5729.61	S.82°32½'W.	—	743.73	—	5681.14	5681.14	—	4,225,234.25
	5729.61	S.70° 08½'E.		1946.01	5389.00	—	5389.00	—	10,487,047.89
			3174.70	3174.70	8744.68	8744.68		55,079,482.39	20,191,748.19

20,191,748.19

2)34,887,734.20

43560) 17,443,867.10 sq. ft.

400.456 Acres.

	489.10	S.7° 27½'E.	—	484.96	63.48	—	11298.80	—	5,479,466.05
B.C. 1° Curve "D" 1071+27.6	5729.61	S.82°32½'W.	—	743.73	—	5681.14	5681.14	—	4,225,234.26
	5729.61	S.70°08½'E.		1946.01	5389.00	—	5389.00	—	10,487,047.8
			3174.70	3174.70	874.468	874.468		55,079,482.39	20,191,748.19
								20,191,748.19	

The area in acres of Swamp Land Survey 1000 lying east of the Sacramento Southern Railroad, in accordance with above traverse, includes the area in the sector of the 1 deg. curve.

The above traverse was made to run to the center of the curve; therefore, to obtain correct number of acres in Swamp Land Survey 1000 lying east of the Sacramento Southern Railroad, is obtained as follows: The area of a circle 5799.61 ft radius equals 2425.829 acres. The portion of the sector of the 1 deg. curve being the west boundary line of Swamp Land Survey 1000 is 184.05 acres; that is, the area of the sector between Stations "D"1098+59 and 1071+27.6. The area of the right of way of the north boundary line between B.C. of the 1 deg. curve Sta 1071 plus 27.6, distance 489.1 ft, right of way being 70 ft wide - is .78 of an acre, making a total acreage of 184.83 to be deducted from 400.46 acres, as found by the above calculation, giving total of 215.62 acres in Swamp Land Survey 1000 lying east of the right of way of the Sacramento Southern Railroad.

0407

intersection of [illegible]

½ mile along body of 565+00
to ¼ sec line extending N & S thru
center sec 24, thence South
1120 ft; thence West 1060 more or
less to ℄ at Ⓢ "D" on T 1110+00

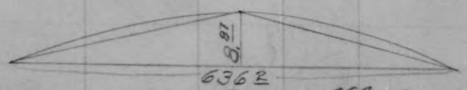
0408

Traverse of Vincent Glann Estate,
being N.W. Portion of Swamp Land Survey No 750, situate in the S.W.¼ of Sec. 24,
T.5 N., R.4E., Mt. Diablo B.+M. County of Sacramento,
State of California. July 27, 1912.

Point	Dist.	∠Lt.	∠Rt.	Bearing	Latitude		Departure		Double Longitude.	Double Areas.	
					N	S	E	W.		+	−
	$93^{\underline{3}}$			N49°01½'W	~~61.18~~ 61.10			~~70.44~~ 70.54	575.84	35183.8	
"T" 1107+94.9											
	$168^{\underline{2}}$			N41°14½'W	126.48			110.89	394.41	49885.0	
	$259^{\underline{3}}$			N27°23½'W	230.23			119.30	164.22	37808.4	
On M³ Line	$207^{\underline{4}}$			N6°13'W.	206.18			22.46	22.46	4630.8	
	$299^{\underline{9}}$			N17°59'E.	~~285.25~~ 284.69		~~92.59~~ 92.16		+ 92.16	26237.0	
	$102^{\underline{8}}$			N5°55'E	102.25		10.60		+ 194.92	19930.6	
	$670^{\underline{51}}$			East	0.00		670.51		+ 876.03	0.0	
"D" 1098+59.0											
	$636^{\underline{2}}$			S22°40'W		587.06		245.17	+ 1301.37		763982.3
			3°08'								
	$470^{\underline{8}}$			S25°48'W.		423.87		204.91	+ 851.29		360836.3
					1010.93	1010.93	773.27	773.27		173675.6	1124818.6

Land to be deeded to S.S.R.R. for Right of Way

173675.6
2|951143.0
43560)475571.5
Acres 10.918



Area 0.064 Acres.

Area between $636^{\underline{2}}$ ft. long Chord of R. of W. curve, and 90 ft. R. of W. line, Acres 0.064

10.982

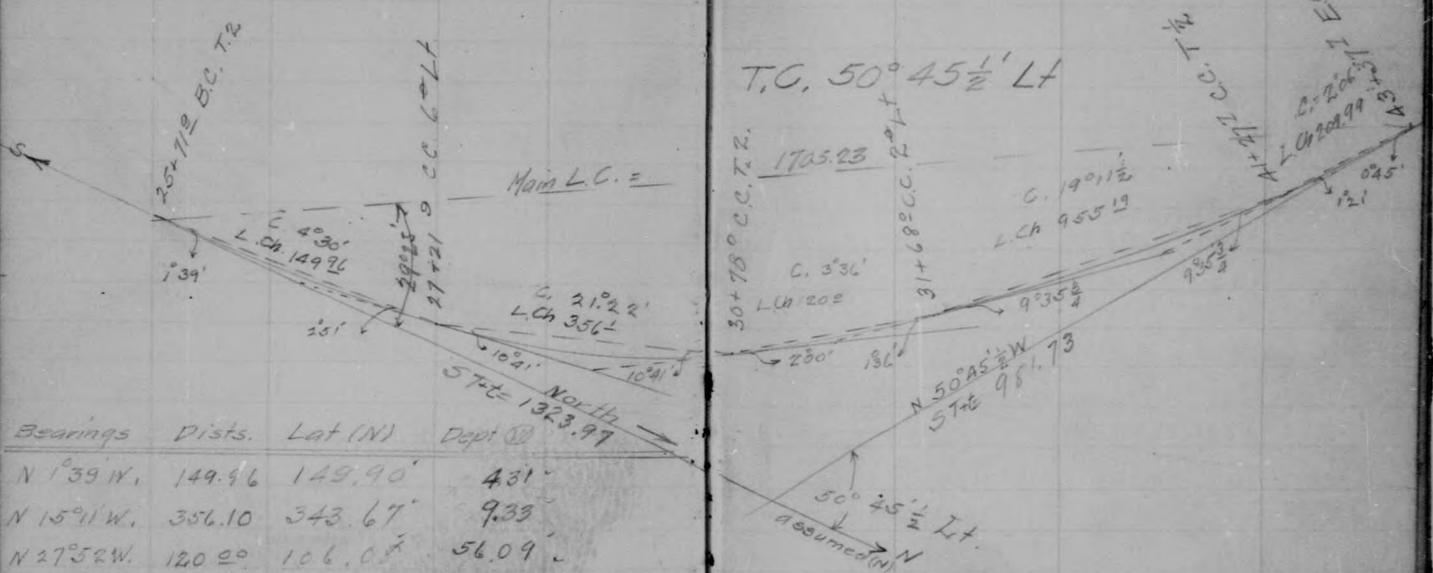
0409

Final and Complete Traverse of the Portion of Swamp Land Survey 1000. Purchased by the Southern Pacific Company from David Bixler (et al).

Station.	Dist.	∡ Lt.	∡ Rt.	Bearing	N. +	S. −	E. +	W. −	Double longitude	Double Areas.
M³ 10+37⁶		—	—							
	52.4			(N 5° 53½' E) N. 5° 55 E.	52.12	—	5.40	—		
M³ 10+90			3° 04½.							
	90.0			(N 8° 58' E) N. 8° 59½ E	88.89	—	14.07	—		
M³ 11+80			37° 50'							
	825.0			(N 46° 48' E) N 46° 49½ E.	564.49	—	601.65	—		
M³ 20+05		62° 10'								
	460.0			(N 15° 22' W) N. 15° 20½ W.	443.61	—	—	121.70		
M³ 24+65			23° 20'							
	470.0			(N 7° 58' E) N. 7° 59½ E	465.44	—	65.34	—		
M³ 29+35		72° 50'								
	680.0			(N 64° 52' W) N. 64° 50½ W.	289.08	—	—	615.49		
M³ 36+15			54° 00'							
	335.0			(N 10° 52' W) N. 10° 50½ W.	329.02	—	—	63.01		
M³ 39+50			30° 30'							
	160.0			(N 19° 38' E) N. 19° 39½ E.	150.67	—	53.83	—		
M³ 41+10		10° 40'								
	795.0			(N 8° 58' E) N. 8° 59½ E.	785.23	—	124.25	—		
M³ 49+05			22° 20'							
	6.3		(closure error of 1 min)	(N 31° 18' E) N. 31° 19½ E.	5.38	—	3.28	—		
M³ 49+11³ (736³ intersect at D. 1066+38⁵ N. 7° 2? ½ W) (82° 17½' intersect ∡)			58° 56½							
	3800.20			S. 89° 45' E	—	16.57	3800.16	—		
			89° 45'							
	3161.75			South	—	3161.75	—	—		
			90° 00'							
	3867.1			West	—	—	—	3867.10		
	[illegible]	143 8°	95° 55' 505° 41		3173.93	3178.32 3173.93 5.39	~~4668.07~~ 4667.98 4667.30 .68	4667.30		

Traverse and diagram showing how tangent dists of compound Curve from "A" 25+71⁹ to "E" 43+37⁷

From Page 50



Bearings	Dists.	Lat (N)	Dept (W)
N 1°39'W.	149.96	149.90	4.31
N 15°11'W.	356.10	343.67	9.33
N 27°52'W.	120.00	106.08	56.09
N 39°03¾'W.	955.19	741.67	601.92
N 50°00½'W.	209.99	134.95	160.87
N 58°45½'W	EC.	1476.27	832.52

0411

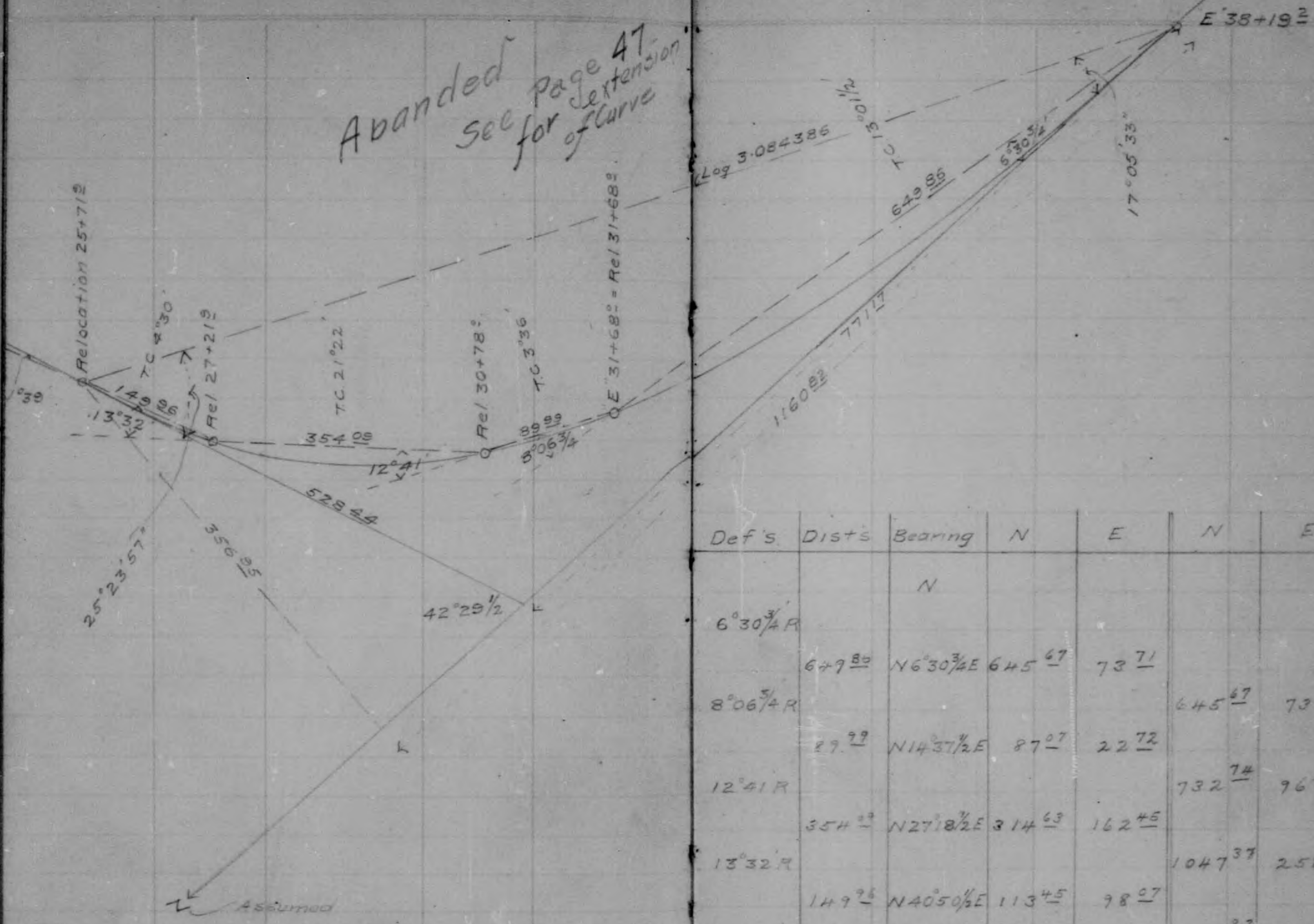
"E" Line See also p. 64

Sta's		Def's L	Def's R	Tangents	S.T's	Dists	Bearings	N	S	E	W	N	E
							N6°38'E						
38+19^{2}			6°56¾'										
						LC 692^{89}	N13°34¾E	673^{59}		162^{68}			
31+24^{8}	CC		8°32¾									673^{59}	162^{68}
						LC 89^{99}	N22°07½E	83^{36}		33^{89}			
30+34^{8}	CC		12°15"									756^{95}	196^{57}
						LC 339^{88}	N34°22½E	280^{52}		191^{90}			
26+93^{1}	CC		13°06'									1037^{47}	388^{47}
						LC 149^{96}	N47°28½E	107^{36}		110^{52}			
25+43^{1}	B.C.		1°39'									1138^{83}	498^{99}
				212^{1}		532^{29}	N49°07½E	348^{34}		402^{48}			
23+31^{0}	E.C				320^{19}								
		9°35'										1487^{17}	701^{47}
16+92^{1}	B.C				320^{19}								
				545^{5}		1019^{59}	N39°32½E	786^{27}		649^{11}			
11+46^{6}	E.C.				153^{90}								
		6°07										2273^{44}	1550^{58}
8+39^{1}	B.C.				153^{90}								
				187^{0}		340^{9}	N33°23½E	284^{63}		187^{62}			
6+52^{1}	*											2558^{07}	1738^{20}
		15°44	42°29½ 15°44 26°45½					2558^{07}		1738^{20}			

* Traverse cannot be carried back further than 6+52^{1}. The notes from this point toward the beginning of the T line are incomplete and the assumption which was made that the stationing on the T line between 6+52^{1} and 3+35^{5}, the beginning and end of the offset line, would be the same as the stationing on the offset line is incorrect. See the calculated offset line, pages 11 and 12. Transit Book 49.

Traverse and diagram showing how tangent distances of compound curve from "E" 38+19.2 (Intersection with Y St.) to "Relocation" 25+71.9 were computed.

50



Abanded
See Page 47 for extension of Curve

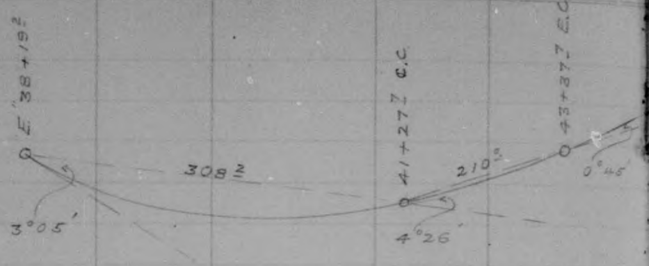
Def's	Dists	Bearing	N	E	N	E
		N				
6°30¾' R						
	$649^{\underline{86}}$	N6°30¾'E	$645^{\underline{67}}$	$73^{\underline{71}}$		
8°06¾' R					$645^{\underline{67}}$	$73^{\underline{71}}$
	$89^{\underline{99}}$	N14°37½'E	$87^{\underline{07}}$	$22^{\underline{72}}$		
12°41' R					$732^{\underline{74}}$	$96^{\underline{43}}$
	$354^{\underline{09}}$	N27°18½'E	$314^{\underline{63}}$	$162^{\underline{45}}$		
13°32' R					1047^{37}	$258^{\underline{88}}$
	$149^{\underline{96}}$	N40°50½'E	$113^{\underline{45}}$	$98^{\underline{07}}$		
1°39' R					$1160^{\underline{82}}$	$356^{\underline{95}}$
		N42°29½'E				

Traverse from "E" $38+19^{2}$ over "Relocation" to intersection with Q St. and back through Front and Y Sts. to point of beginning. See also p. 66

Sta's		Def's L.	Def's R	Tangents	S.T's	Dist's	Bearings	N	S	E	W	N	E
					771^{17}								
			42°29½			771^{17}	N 6°38 E	766^{01}		89^{09}			
$25+71^{9}$	B.C.				528^{44}							766^{01}	89^{09}
				236^{00}		1004^{57}	N 49°07½ E	657^{40}		759^{59}			
$23+35^{9}$	E.C.				240^{13}							1423^{41}	848^{68}
		9°35'											
$18+56^{73}$	B.C.				240^{13}								
				928^{93}		1169^{06}	N 39°32½ E	901^{53}		744^{27}			
$9+27^{80}$	(P.I.)	4°18'									✓	2324^{94}	1592^{95}
				673^{47}		673^{47}	N 35°14½ E	550^{04}		388^{61}			
Int. Q St.			73°31½									2874^{98}	1981^{56}
						93^{95}	S 71°14 E		30^{22}	88^{96}			
Int. Front St. (Q St.)			90°04'									2844^{76}	2070^{52}
						420^{00}	S 18°50 W		397^{51}		135^{58}		
To R St.		0°04'										2447^{25}	1934^{94}
						2943^{21}	S 18°46 W		2786^{75}		946^{86}	S	E
To Y St.			90°12½									339^{50}	988^{08}
						1045^{03}	N 71°01½ W	339^{79}			988^{24}	N	W
To E Line			77°39½									0^{29}	0^{16}
		13°57'	373°57'				N 6°38 E	3214^{77}	3214^{48}	2070^{52}	2070^{68}		
			13°57'					48			52		
			360°00					29			16		

It is not to be understood from this traverse that Front St. from R to Y is a straight line. The 0°04' angle shown at R St. is the angle between the course from R to Q and the course directly from R to Y, the transit being sighted from R to Y and the intervening monuments disregarded for the purpose simply of determining a general closure. See page 53 to page 59.

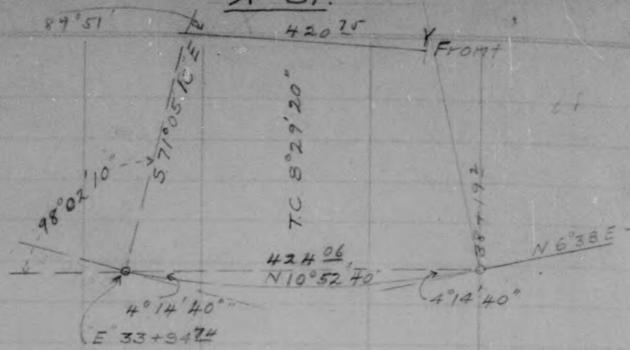
Traverse from "E" $38+19^{2}$ to "E" $43+37^{7}$



			S	E	W	S	W
		S 6°38' W					
3°05' L							
	308^{2}	S 3°33' W	307^{6}		19^{1}		
4°26' L						307^{6}	19^{1}
	210^{0}	S 0°53' E	210^{0}	3^{2}			
0°45'						517^{6}	15^{9}
		S 1°38' E					

Traverses (this page and following) of ties of City Engineer's hubs on Front St. to "Relocation"

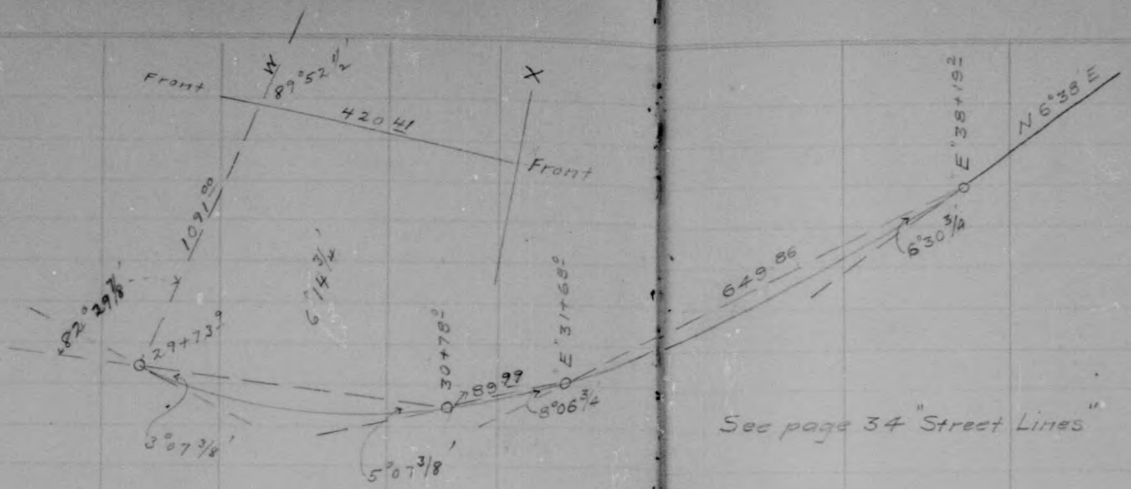
X St.



See page 35 "Street Lines"

			N 6°38 E	N	S	E	W	N	E
E 38+19.2	4°14'40" R								
		424^{06}	N10°52'40"E	416^{43}		80^{02}			
E 33+74.74	98°02'10"R							416^{43}	80^{02}
		1103^{45}	S71°05'10"E		357^{67}	1043^{87}			
X-Front	89°51 R							58^{76}	1123^{89}
		420^{75}	S18°45'50"W		398^{39}		135^{34}		
Y-Front	90°12½ R							S 339^{63}	988^{55}
		1045^{03}	N71°01'40W	339^{75}			988^{26}		
	77°39½ R							N 0^{12}	E 0^{29}
			N6°37'50" E						

W St

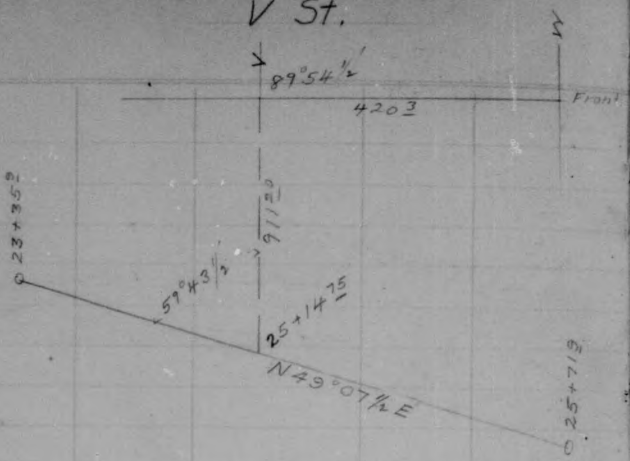


See page 34 "Street Lines"

			N6°38'E	N	S	E	W	N	E
E°38+19^{2}	6°30¾R								
		649^{86}	N13°08¾E	632^{84}		147^{80}			
E°31+68^{0}	8°06¾R								
		89^{99}	N21°15½E	83^{87}		32^{63}			
30+78^{0}	5°07⅜R								
		104^{06}	N26°22⅞E	93^{22}		46^{24}			
29+73^{9}	82°29⅞R								
		1091^{00}	S71°07¼E		353^{01}	1032^{33}			
W-Front	89°52½R							456^{92}	1259^{00}
		420^{41}	S18°45¼W		398^{09}		135^{17}		
X-Front								58^{83}	1123^{83}
X-Front (p 53)								58^{76}	1123^{89}
								07	- 06

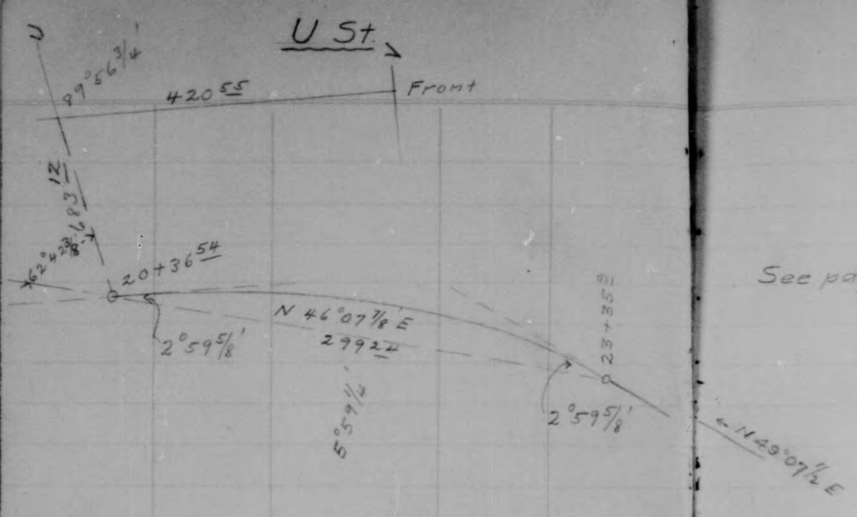
0417

V St.



See page 33 "Street Lines"

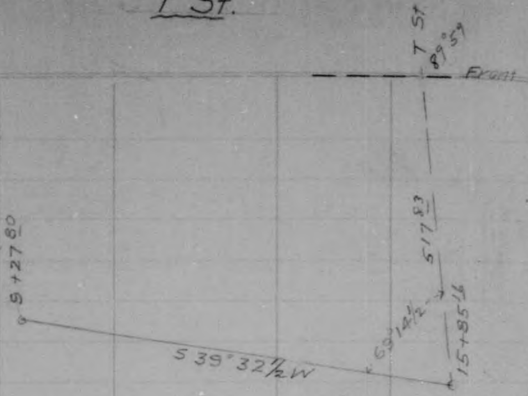
				N	S	E	W	N	E
PI (Ahead) S.T. 240'3								1423^{41}	848^{68}
		418^{98}	S49°07½W		274^{18}		316^{80}		
25+14.75	120°16½L								
		911^{20}	S71°09 E		294^{40}	862^{33}			
V-Front	87°54½R							854^{83}	1394^{21}
		420^{30}	S18°45½W		397^{98}		135^{16}		
W-Front								456^{85}	1259^{05}
W-Front (p.54)								456^{92}	1259^{00}
								- 07	05



See page 32 "Street Lines"

				N	S	E	W	N	E
PI								766^{01}	89^{09}
PI		764^{44}	N49°07½E	500^{26}		578^{02}			
	2°59 5/8' L								
2		299^{24}	N46°07⅞E	207^{38}		215^{73}			
	62°42 3/8 R								
V- U-Front		683^{12}	S71°09¾E		220^{57}	646^{53}		1253^{08}	1529^{37}
	89°56¾ R								
W V-Front		420^{55}	S18°47'W		398^{15}		135^{41}	854^{93}	1393^{96}
W V-Front (p.55)								854^{83}	1394^{21}
								10	− 25

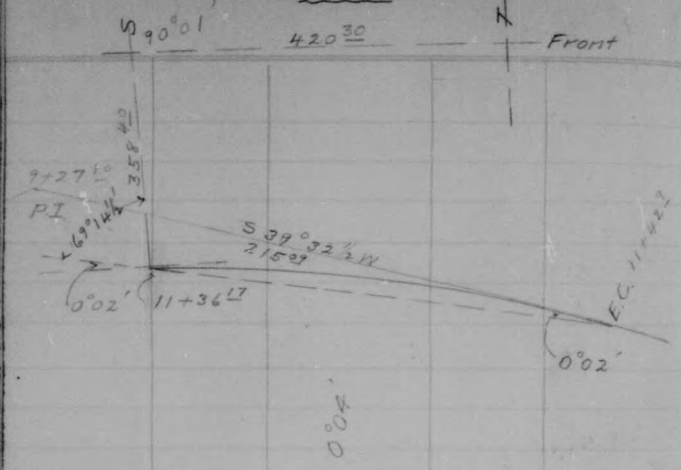
T St.



See page 31 "Street Lines"

				N	S	E	W	N	S	E	W
9+27^{80}								2324^{94}		1592^{95}	
		657^{86}	S39°32½'W		506^{93}		418^{50}				
15+85^{16}	110°45½' L										
		517^{83}	S71°13'E		166^{74}	490^{25}					
T-Front	89°59' R							1651^{27}		1664^{70}	
		420^{40}	S18°46'W		398^{05}		135^{25}				
U-Front								1253^{22}		1529^{45}	
U-Front (p 56)								1253^{08}		1529^{37}	
								14		08	

S St.



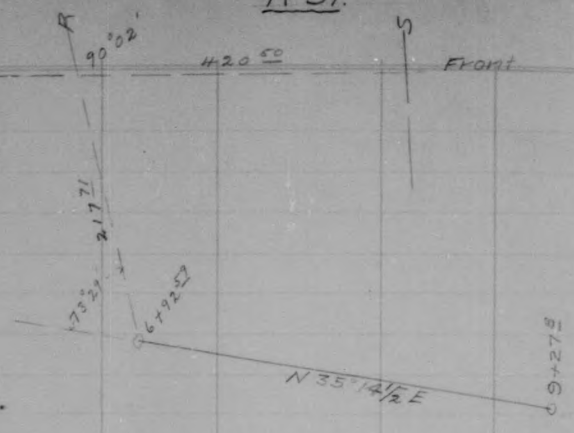
✓

See page 30 "Street Lines"

				N	S	E	W	N	S	E	W
$9+27^{80}$								2324^{94}		1592^{95}	
		215^{09}	S39°32½W		165^{87}		136^{93}				
$11+42^{9}$	0°02'L										
		6^{67}	N39°30½E	5^{15}		4^{24}					
	69°14½R										
		358^{40}	S71°15'E		115^{20}	339^{38}					
S-Front	90°01R							2049^{02}		1799^{64}	
		420^{30}	S18°46W		397^{96}		135^{21}				
T-Front								1651^{06}		1664^{43}	
T-Front (p 57)								1651^{27}		1664^{70}	
								21		27	

0421

R St.



See page 29 "Street Lines"

				N	S	E	W	N	S	E	W
$9+27^{80}$								2324^{94}		1592^{95}	
		235^{21}	N35°14½'E	192^{10}		135^{72}					
$6+92^{59}$	73°27'R										
		217^{21}	S71°16½'E		69^{89}	206^{19}					
R-Front	90°02'R							2447^{15}		1934^{86}	
		420^{50}	S18°45½'W		398^{17}		135^{22}				
S-Front								2048^{98}		1799^{64}	
S-Front								2049^{02}		1799^{64}	
								04		00	

0422

Traverse "E" & "T" Lines Sta 6+52^{1} to Sta 0+00 disregarding offset line

See note p. 49.

Sta's	L	R	Tangents	S. T's	Dist's	Bearings	N	S	E	W	N	E
6+52^{1}											2558^{07}	1738^{20}
					317^{1}	N33°23½E	264^{76}		174^{52}			
3+35^{0}	4°15'										2822^{83}	1912^{72}
					167^{0}	N29°08½E	145^{86}		81^{32}			
1+68^{0}	1°15'										2968^{69}	1994^{04}
					78^{45}	N27°53½E	69^{34}		36^{70}			
0+89^{55}		1°34'									3038^{03}	2030^{74}
					50^{25}	N29°27½E	43^{75}		24^{71}			
0+39^{3}	6°22										3081^{78}	2055^{45}
					39^{30}	N23°05½E	36^{15}		15^{41}			
0+00 = 22+48 Cons. Line											3117^{93}	2070^{86}

Traverse placing Cons. Sta. "22+48" independently of "E" and "T" Lines from 6+52^{1} back. See p.69 Transit Book #15 and preliminary traverse p 45

Sta's	L	R	Tangents	S. T's	Dist's	Bearings	N	S	E	W	N	E
11+98^{15}											3019^{44}	2036^{93}
					104^{65}	N22°20½E	96^{81}		39^{80}			
10+93^{50}	90°00										3116^{25}	2076^{73}
					6^{50}	N67°39½W	2^{47}			6^{01}		
"T" 0+00 = Cons 22+48											3118^{72}	2070^{72}

Inasmuch as this independent traverse places Sta 0+00 of the "T" line in practically the same position as it is placed by the "T" line traverse itself, the error resulting from the incorrect assumption noted on p 49 is taken as of no consequence and the "T" traverse is used for plotting even though there is a strong probability that the bearings from Sta 3+35^{0} to Sta 0+00 are not exactly right as a consequence of the erroneous assumption made.

0423

Knox's Spur (P 45 Preliminary Lines Book No 1)

"K" Line

	L	R	Tangents	S.T's	Dist's	Bearings	N	S	E	W	N	E
						N 6°38' E						
"E" $38+19^{2}$		6°15'									0	0
					L.C 623^{28}	N 12°53' E	608^{08}		139^{08}			
"E" $31+94^{0}$		96°15'									608^{08}	139^{08}
					17^{21}	S 70°52' E		5^{80}	16^{73}			
K $0+73^{8}$	83°38'			317^{35}							602^{28}	155^{81}
			30^{00}		347^{35}	N 25°30' E	313^{51}		149^{54}			
P.I.		83°03		317^{35}							915^{79}	305^{35}
			692^{6}		1009^{95}	S 71°27 E		321^{30}	957^{48}			
K $13+15^{5}$											594^{49}	1262^{83}

"A" Line Traverse (Cont. See p. 51)

Sta's		L	R	Tangent	S.T.	Dist	Bearing	N	S	E	W	N	E
"A"							N 39°32½ E						
$9+27^{8}$	(PI)	4°18'										2324^{94}	1592^{95}
$7+12^{9}$	B.C. 1°R				215^{09}								
				346^{51}		730^{93}	N35°14½E	596^{97}		421^{76}			
$3+66^{39}$	E.C.	*			$169.^{33}$ $(169\ ^{32})$								
		13°29'										2921^{91}	2014^{7}
$0+29^{31}$	B.C. 4°R				$169\ ^{33}$ $(169\ ^{32})$ 12/08								
				29^{31}									
"A" 0+00	P.O.T.					581^{38} (581^{87})	N21°45½E (N21°44'E) 12/08	539^{96} (539^{27}) 12/08		215^{51} (215^{16}) 12/08			
"B" B $22+52^{95}$	P.O.T.												
				281^{04}									
$19+71^{91}$	E.C.				101^{70}								
		2°02'										3461^{87} (3461^{48})	2230^{22} (2229^{87})
$17+68^{58}$	B.C. 1°R				101^{70}								
				219^{70}		432^{82}	N19°43½E (N19°42'E) 12/08	407^{42} (407^{50})		146^{08} (145^{90})			
$15+48^{88}$	E.C.				111^{42}								
		3°20½'										3869^{29}	2376^{30}
"B" $13+26^{1}$ = 13+26.1 Consl° Line	B.C. 1°30'R				111^{42}								
						111^{42}	N16°23 E	106^{89}		31^{43}		3976^{48}	2407^{73}

* 0°0½' found Dec/08 making T.C. 13°2[illegible]

S.T. $169.^{32}$ B.C. "A" $0+29^{62}$ 4° Rt A $3+66^{08}$ E.C.

0425

"D" LINE

Sta's		L	R	Tang.	S.T.	Dist	Bearings	N	S	E	W	S	W
"E" 637+07^{9}	E.C.												
							S 2°31'W						
"E" 733+71^{8} =	P.o.T.			9663^{9}									
"D" 733+71^{8}	B.C.												
	0°30' Lt.				982^{40}	10646^{3}	S 2°31'W.						
P.I.		9°48'											
					982^{40}								
"D" 753+31^{8}	E.C.												
				31795^{82}									
"D" 1071+27^{62}	B.C. 1°Rt												
					1711^{26}	34489^{48}	S 7°17E.						
P.I.			33°15½'										
					1711^{26}								
"D" 1104+53^{45}	E.C.												
				311^{95}									
"D" 1108+65^{3} =	P.o.T.												
"T" 1107+60^{1}	E.C.												
				8983^{2}									
"T" 1197+43^{7} =	P.o.T.												
"E" 1420+45^{5}	E.C.					11006^{41}	S 25°58½'W						

Traverse for acreage for Lease in Blk 20 Brannans Add.

Opp. E33+94^{74}	Course.	Dist.	N +	S −	E +	W −	Double Long. +	Double Long. −	+	−
	S71°05E	213^{6}		69.25	202.06		202.06			13992.66
	S18°43½W	379^{8} ~~381^{5}~~		359.74 ~~361.31~~		121.92 ~~122.47~~	282.20 ~~281.65~~			101518.63 ~~101762.96~~
	N71°01½W	91^{47}	29.74			86.51	73.77 ~~72.67~~		2193.92 ~~2161.21~~	
	N7°51½W	168^{1}	166.52			22.98		35.72 ~~36.82~~		5948.09 ~~6131.27~~
	N3°55½E	158^{0}	157.63		10.82			47.88 ~~48.98~~		7547.32 ~~7720.72~~
	N 14°18'E	77^{6}	75.21		19.17			17.89 ~~18.99~~		1345.51 ~~1428.24~~
			429.10 428.99 0.11	~~430.51~~ ~~429.10~~ 1.46 428.99	~~232.05~~ 231.96 .09 232.05 231.41 0.64	~~231.96~~ 231.41			2	131035.85 2161.21 2 | 128874.64 64437.32

~~43560 \| 64437.32~~

~~1,479±~~

2 | 128,158.29
64,079.145

43560 | 64,079.145
1.471 Acres

Note: The distance 379^{8} ft. substituted for 381^{5} ft. in this traverse is taken from the field notes of a survey of Block 20, Brannan's Addition, made on October 6, 1909. See Transit Book #15, page 66.

Traverse of "Y" Line on R Street

See Book #9.

Station	Degree of Curve.	Central Angle	Radius	Diff of Radii	Bearing	Latitude		Departure		Totals Lat		Dept	
						N	S	E	W	N	S	E	W.
"Y" 10+40± E.C.				1282.825	North	1282^{825}				1282^{825}			
33+35± E.C.	4°28'	R 3°22	1282.825										
9+65 B.C.				1282^{825}	S 3°22'W		1280^{61}		75^{33}	2^{21}			75.33
	Tang			255^{0}	N 86°38'W	$\cdot 14^{98}$			254^{56}	17^{19}			329^{89}
7+10 E.C.				987.965	S 3°22 2W		986^{26}		58.02		969^{07}		387^{91}
	5°48'	L 6°23'	987^{965}										
6+00 C.C.				285^{355}	S 3°01'E		284^{96}	15^{02}			1254^{03}		372^{89}
	4°30'	L 4°30'	1273^{320}										
5+00 C.C.				735^{980}	N 7°31'W	729^{66}			96^{28}		524^{37}		469^{17}
	10°40'	L 16°00'	537^{34}										
3+50 C.C.				257^{425}	N 23°31'W	236^{09}			102^{74}		288^{28}		571^{91}
	20°30'	L 20°30'	279.865										
2+50 C.C.				905^{655}	S 44°01'E		651^{29}	629^{31}			939^{57}	57^{40}	
	4°50'	L 2°25'	1180^{52}										
2+00 C.C.				841^{442}	N 46°26'W	579^{92}			609^{69}		359^{65}		552^{29}
	16°40'	L 8°20'	344^{078}										
1+50 C.C.				1859.652	S 54°46'E		1072^{85}	1518^{98}			1432^{50}	966^{69}	
	L 2°36	L 2°24'	1203^{73}										
0+57± C.C.				1859^{652}	N 57°10'W	1008^{3}			1562^{58}		424^{20}		595^{89}
	16°40'	L 9°38'	344^{078}										
Y 0+00 B.C. opp. T 10+70.5				344^{078}	N 66°48'W	135^{55}			316^{25}		288^{65}		912.14
						3987^{32}	4275^{97} 3987.32 288.65	2163^{31}	3075^{45} 2163.31 912.14				

Tammen & Laster.
12/08

Traverse of Placerville Branch Notes Book #9. Totals

Sta.	Degree of Curve	Cent Angle Rt.	Diff of Radii	Bearing	Latitude N	Latitude S	Departure E	Departure W	Lat N	Lat S	Dept. E	Dept. W	Radius
Tang. 33+35½ E.C. Y 10+40^{4} E.C.			625^{21}	North.	625^{21}				625^{21}				625^{21}
	9°10'												
32+00 C.C.		12°23'	697^{08}	N12°23'E	680^{86}		149^{49}		1306^{07}		149^{49}		1322^{29}
	4°20'												
31+50 C.C.		2°10'	963^{9}	S14°33'W		932^{99}		242^{16}	373^{08}			92^{67}	358^{39}
	16°												
31+00 C.C.		8°00'	501^{17}	N22°33'E	462^{86}		192^{19}		835^{94}		99^{52}		859^{56}
	6°40'												
30+50 C.C.		3°20'	477^{315}	S25°53'W		429^{43}		208^{37}	$406.^{51}$			108^{85}	382^{245}
	15°												
30+00 C.C.		7°30'	1336^{69}	N33°23'E	1116^{15}		735^{5}		1522.66		626^{65}		1718^{935}
	3°20'												
29+50 C.C.		1°40'	1241^{352}	S35°03'W		1016^{35}		712^{84}	$506.^{51}$			86^{19}	477^{683}
	12°												
29+00 C.C.		6°00'	2960^{092}	N41°03'E	2232^{31}		1943^{95}		2738^{82}		$1857.^{76}$		3437^{775}
	1°40'												
28+60 C.C.		0°40'	2736^{045}	S41°43'W		2042^{3}		1820^{7}	696^{52}		37^{06}		701^{73}
	8°10'												
27+00 C.C.		13°04'	172^{65}	S54°47'W		99^{56}		$141.^{05}$	596^{96}			163^{29}	529^{08}
	10°50'												
26+25 C.C.		8°07½'	44^{059}	N62°54½'E	20^{06}		39^{21}		617^{02}			64^{78}	573^{139}
	10°												
25+00 C.C.		12°30'	190^{894}	S75°24½'W		48^{09}		184^{73}	568.93			249^{51}	382^{245}
	15°												
24+35 C.C.		9°45^{8}	190^{894}	N85°04^{7}E	16^{1}		190^{21}		585^{03}			59^{30}	573^{139}
	10°												
23+24^{7} BC		11°01^{8}'	573^{139}	N83°48½'W	61^{81}			569^{81}	646^{84}			629^{11}	573^{139}
		90°00' R	Tang.	N6°11½'E	5215^{30} 4568^{52} 646.84	4566^{52}	3250^{55}	3879^{66} 3250^{55} 629^{11}					

Johnson & Moffat
12/08.

TABLE IV.—MINUTES IN DECIMALS OF A DEGREE.

1′	.0167	**11′**	.1833	**21′**	.3500	**31′**	.5167	**41′**	.6833	**51′**	.8500
2	.0333	**12**	.2000	**22**	.3667	**32**	.5333	**42**	.7000	**52**	.8667
3	.0500	**13**	.2167	**23**	.3833	**33**	.5500	**43**	.7167	**53**	.8833
4	.0667	**14**	.2333	**24**	.4000	**34**	.5667	**44**	.7333	**54**	.9000
5	.0833	**15**	.2500	**25**	.4167	**35**	.5833	**45**	.7500	**55**	.9167
6	.1000	**16**	.2667	**26**	.4333	**36**	.6000	**46**	.7667	**56**	.9333
7	.1167	**17**	.2833	**27**	.4500	**37**	.6167	**47**	7833	**57**	.9500
8	.1333	**18**	.3000	**28**	.4667	**38**	.6333	**48**	.8000	**58**	.9667
9	.1500	**19**	.3167	**29**	.4833	**39**	.6500	**49**	.8167	**59**	.9833
10	.1667	**20**	.3333	**30**	.5000	**40**	.6667	**50**	.8333	**60**	1.0000

TABLE V.—INCHES IN DECIMALS OF A FOOT.

1-16 .0052	3-32 .0078	⅛ .0104	3-16 .0156	¼ .0208	5-16 .0260	⅜ .0313	½ .0417	⅝ .0521	¾ .0625	⅞ .0729
1 .0833	2 .1667	3 .2500	4 .3333	5 .4167	6 .5000	7 5833	8 .6667	9 .7500	10 .8333	11 .9167

TABLE VI.—RADII, ORDINATES AND DEFLECTIONS.

Deg.	Radius	Mid Ord	Tan Def.	Chd. Def	Def for 1 Foot	Deg.	Radius	Mid Ord.	Tan Def.	Chd Def.	Def. for 1 Foot
0° 10′	34377.	.036	.145	.291	0.05′	**7°**	819.0	1.528	6.105	12.21	2.10′
20	17189.	.073	.291	.582	0.10	20′	781.8	1.600	6.395	12.79	2.20
30	11459.	.109	.436	.873	0.15	30	764.5	1.637	6.540	13.08	2.25
40	8594.4	.145	.582	1.164	0.20	40	747.9	1.673	6.685	13.37	2.30
50	6875.5	.182	.727	1.454	0.25	**8**	716.8	1.746	6.976	13.95	2.40
1	5729.6	.218	.873	1.745	0.30	20	688.2	1.819	7.266	14.53	2.50
10	4911.2	.255	1.018	2.036	0.35	30	674.7	1.855	7.411	14.82	2.55
20	4297.3	.291	1.164	2.327	0.40	40	661.7	1.892	7.556	15.11	2.60
30	3819.8	.327	1.309	2.618	0.45	**9**	637.3	1.965	7.846	15.69	2.70
40	3437.9	.364	1.454	2.909	0.50	20	614.6	2.037	8.136	16.27	2.80
50	3125.4	.400	1.600	3.200	0.55	30	603.8	2.074	8.281	16.56	2.85
2	2864.9	.436	1.745	3.490	0.60	40	593.4	2.110	8.426	16.85	2.90
10	2644.6	.473	1.891	3.781	0.65	**10**	573.7	2.183	8.716	17.43	3.00
20	2455.7	.509	2.036	4.072	0.70	30	546.4	2.292	9.150	18.30	3.15
30	2292.0	.545	2.181	4.363	0.75	**11**	521.7	2.402	9.585	19.16	3.30
40	2148.8	.582	2.327	4.654	0.80	30	499.1	2.511	10.02	20.04	3.45
50	2022.4	.618	2.472	4.945	0.85	**12**	478.3	2.620	10.45	20.91	3.60
3	1910.1	.655	2.618	5.235	0.90	30	459.3	2.730	10.89	21.77	3.75
10	1809.6	.691	2.763	5.526	0.95	**13**	441.7	2.839	11.32	22.64	3.90
20	1719.1	.727	2.908	5.817	1.00	30	425.4	2.949	11.75	23.51	4.05
30	1637.3	.764	3.054	6.108	1.05	**14**	410.3	3.058	12.18	24.37	4.20
40	1562.9	.800	3.199	6.398	1.10	30	396.2	3.168	12.62	25.24	4.35
50	1495.0	.836	3.345	6.689	1.15	**15**	383.1	3.277	13.05	26.11	4.50
4	1432.7	.873	3.490	6.980	1.20	30	370.8	3.387	13.49	26.97	4.65
10	1375.4	.909	3.635	7.271	1.25	**16**	359.3	3.496	13.92	27.84	4.80
20	1322.5	.945	3.718	7.561	1.30	30	348.5	3.606	14.35	28.70	4.95
30	1273.6	.982	3.926	7.852	1.35	**17**	338.3	3.716	14.78	29.56	5.10
40	1228.1	1.018	4.071	8.143	1.40	**18**	319.6	3.935	15.64	31.29	5.40
50	1185.8	1.055	4.217	8.433	1.45	**19**	302.9	4.155	16.51	33.01	5.70
5	1146.3	1.091	4.362	8.724	1.50	**20**	287.9	4.374	17.37	34.73	6.00
10	1109.3	1.127	4.507	9.014	1.55	**21**	274.4	4.594	18.22	36.44	6.30
20	1074.7	1.164	4.653	9.305	1.60	**22**	262.0	4.814	19.08	38.16	6.60
30	1042.1	1.200	4.798	9.596	1.65	**23**	250.8	5.035	19.94	39.87	6.90
40	1011.5	1.237	4.943	9.886	1.70	**24**	240.5	5.255	20.79	41.58	7.20
50	982.6	1.273	5.088	10.18	1.75	**25**	231.0	5.476	21.64	43.28	7.50
6	955.4	1.309	5.234	10.47	1.80	**26**	222.3	5.697	22.50	44.99	7.80
10	923.6	1.346	5.379	10.76	1.85	**27**	214.2	5.918	23.35	46.69	8.10
20	905.1	1.382	5.524	11.05	1.90	**28**	206.7	6.139	24.19	48.38	8.40
30	881.9	1.418	5.669	11.34	1.95	**29**	199.7	6.360	25.04	50.07	8.70
40	859.9	1.455	5.814	11.63	2.00	**30**	193.2	6.583	25.88	51.76	9.00

TABLE VII.—TANGENTS AND EXTERNALS TO A 1° CURVE.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
1°	50.00	.22	11°	551.70	26.50	21°	1061.9	97.57
10′	58.34	.30	10′	560.11	27 31	10′	1070.6	99.16
20	66.67	.39	20	568.53	28.14	20	1079.2	100.75
30	75.01	.49	30	576.95	28.97	30	1087 8	102.35
40	83.34	.61	40	585.36	29.82	40	1096.4	103.97
50	91.68	.73	50	593.79	30.68	50	1105.1	105.60
2	100.01	.87	12	602.21	31.56	22	1113.7	107.24
10	108.35	1.02	10	610.64	32.45	10	1122.4	108.90
20	116.68	1.19	20	619.07	33.35	20	1131.0	110.57
30	125.02	1.36	30	627 50	34.26	30	1139.7	112.25
40	133.36	1.55	40	635.93	35.18	40	1148.4	113.95
50	141.70	1.75	50	644.37	36.12	50	1157.0	115.66
3	150.04	1.96	13	652.81	37.07	23	1165.7	117.38
10	158.38	2.19	10	661.25	38.03	10	1174.4	119.12
20	166.72	2.43	20	669.70	39.01	20	1183.1	120.87
30	175.06	2.67	30	678.15	39.99	30	1191.8	122.63
40	183.40	2.93	40	686.60	40.99	40	1200 5	124.41
50	191.74	3.21	50	695.06	42.00	50	1209.2	126.20
4	200.08	3.49	14	703.51	43.03	24	1217.9	128.00
10	208.43	3.79	10	711.97	44.07	10	1226.6	129.82
20	216.77	4.10	20	720.44	45.12	20	1235.3	131 65
30	225.12	4.42	30	728.90	46.18	30	1244.0	133.50
40	233.47	4.76	40	737.37	47.25	40	1252 8	135.35
50	241.81	5.10	50	745 85	48.34	50	1261.5	137.23
5	250.16	5.46	15	754.32	49.44	25	1270.2	139.11
10	258.51	5.83	10	762.80	50.55	10	1279.0	141.01
20	266.86	6.21	20	771.29	51.68	20	1287.7	142.93
30	275.21	6.61	30	779.77	52.89	30	1296.5	144.85
40	283.57	7.01	40	788.26	53.97	40	1305.3	146.79
50	291.92	7.43	50	796.75	55.13	50	1314.0	148.75
6	300.28	7.86	16	805 25	56.31	26	1322.8	150.71
10	308.64	8.31	10	813.75	57.50	10	1331.6	152.69
20	316.99	8 76	20	822.25	58.70	20	1340.4	154 69
30	325.35	9.23	30	830.76	59.91	30	1349.2	156 70
40	333.71	9.71	40	839.27	61.14	40	1358 0	158.72
50	342.08	10.20	50	847.78	62.38	50	1366.8	160.76
7	350.44	10.71	17	856.30	63.63	27	1375.6	162.81
10	358.81	11.22	10	864.82	64.90	10	1384.4	164.86
20	367.17	11.75	20	873.35	66.18	20	1393.2	166.95
30	375.54	12.2[illegible]	30	881 88	67.47	30	1402 0	169.04
40	383.91	12.85	40	890.41	68.77	40	1410.9	171.15
50	392.28	13.41	50	898.95	70.09	50	1419.7	173.27
8	400.66	13.99	18	907.49	71.42	28	1428 6	175.41
10	409.03	14.58	10	916.03	72.76	10	1437.4	177 55
20	417.41	15.18	20	924.58	74.12	20	1446 3	179.72
30	425.79	15.80	30	933.13	75.49	30	1455.1	181.89
40	434.17	16.43	40	941.69	76.86	40	1464.0	184.08
50	442.55	17.07	50	950.25	78.26	50	1472.9	186.29
9	450.93	17.72	19	958 81	79.67	29	1481.8	188.51
10	459.32	18.38	10	967.38	81.09	10	1490.7	190.74
20	467.71	19.06	20	975 96	82.53	20	1499 6	192 99
30	476.10	19.75	30	984.53	83.97	30	1508 5	195.25
40	484.49	20.45	40	993.12	85.43	40	1517.4	197.53
50	492.88	21.16	50	1001.7	86.90	50	1526 3	199.82
10	501.28	21.89	20	1010.3	88.39	30	1535.3	202.12
10	509.68	22.62	10	1018.9	89.89	10	1544.2	204.44
20	518.08	23.38	20	1027.5	91.40	20	1553 1	206.77
30	526.48	24.14	30	1036 1	92.92	30	1562 1	209.12
40	534.89	24.91	40	1044.7	94.46	40	1571 0	211 48
50	543.29	25 70	50	1053.3	96.01	50	1580 0	213 86

TABLE.—VII.—TANGENTS AND EXTERNALS TO A 1° CURVE.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
31°	1589.0	216.3	41°	2142.2	387.4	51°	2732.9	618.4
10′	1598.0	218.7	10′	2151.7	390.7	10′	2743.1	622.8
20	1606.9	221.1	20	2161.2	394.1	20	2753.4	627.2
30	1615.9	223.5	30	2170.8	397.4	30	2763.7	631.7
40	1624.9	226 0	40	2180.3	400.8	40	2773.9	636.2
50	1633.9	228.4	50	2189.9	404.2	50	2784.2	640.7
32	1643.0	230.9	42	2199.4	407.6	52	2794.5	645.2
10	1652.0	233.4	10	2209.0	411.1	10	2804.9	649.7
20	1661.0	235.9	20	2218.6	414.5	20	2815.2	654.3
30	1670.0	238.4	30	2228.1	418.0	30	2825.6	658.8
40	1679.1	241.0	40	2237.7	421.4	40	2835.9	663.4
50	1688.1	243.5	50	2247.3	425.0	50	2846.3	668.0
33	1697.2	246.1	43	2257.0	428.5	53	2856.7	672.7
10	1706.3	248.7	10	2266.6	432.0	10	2867.1	677.3
20	1715.3	251.3	20	2276.2	435.6	20	2877.5	682.0
30	1724.4	253.9	30	2285.9	439.2	30	2888.0	686.7
40	1733.5	256.5	40	2295.6	442.8	40	2898.4	691.4
50	1742.6	259.1	50	2305.2	446.4	50	2908.9	696.1
34	1751.7	261.8	44	2314.9	450.0	54	2919.4	700.9
10	1760.8	264.5	10	2324.6	453.6	10	2929.9	705.7
20	1770.0	267.2	20	2334.3	457.3	20	2940.4	710.5
30	1779.1	269.9	30	2344.1	461.0	30	2951.0	715.3
40	1788.2	272.6	40	2353.8	464.6	40	2961.5	720.1
50	1797.4	275.3	50	2363.5	468.4	50	2972.1	725.0
35	1806.6	278.1	45	2373.3	472.1	55	2982.7	729 9
10	1815.7	280.8	10	2383.1	475.8	10	2993.3	734.8
20	1824.9	283.6	20	2392.8	479.6	20	3003.9	739.7
30	1834.1	286.4	30	2402.6	483.8	30	3014 5	744.6
40	1843.3	289.2	40	2412.4	487.2	40	3025.2	749.6
50	1852.5	292.0	50	2422.3	491.0	50	3035.8	754.6
36	1861.7	294.9	46	2432.1	494.8	56	3046.5	759.6
10	1870.9	297.7	10	2441.9	498.7	10	3057.2	764.6
20	1880.1	300.6	20	2451.8	502.5	20	3067.9	769.7
30	1889.4	303.5	30	2461.7	506.4	30	3078 7	774.7
40	1898.6	306.4	40	2471.5	510.3	40	3089.4	779.8
50	1907.9	309.3	50	2481.4	514.3	50	3100.2	784.9
37	1917.1	312.2	47	2491.3	518.2	57	3110.9	790.1
10	1926.4	315.2	10	2501.2	522.2	10	3121.7	795.2
20	1935.7	318.1	20	2511.2	526.1	20	3132.6	800.4
30	1945.0	321.1	30	2521.1	530.1	30	3143.4	805.6
40	1954 3	324.1	40	2531.1	534.2	40	3154.2	810.9
50	1963.6	327.1	50	2541.0	538.2	50	3165.1	816.1
38	1972.9	330.2	48	2551.0	542.2	58	3176.0	821.4
10	1982.2	333.2	10	2561.0	546.3	10	3186.9	826.7
20	1991.5	336.3	20	2571.0	550.4	20	3197.8	832.0
30	2000.9	339.3	30	2581.0	554.5	30	3208.8	837.3
40	2010.2	342.4	40	2591.0	558.6	40	3219.7	842.7
50	2019.6	345.5	50	2601.1	562.8	50	3230.7	848.1
39	2029.0	348.6	49	2611.2	566.9	59	3241.7	853.5
10	2038.4	351.8	10	2621.2	571.1	10	3252.7	858.9
20	2047.8	354.9	20	2631.3	575.3	20	3263.7	864.3
30	2057.2	358.1	30	2641.4	579.5	30	3274.8	869.8
40	2066.6	361.3	40	2651.5	583.8	40	3285.8	875.3
50	2076.0	364.5	50	2661.6	588.0	50	3296.9	880.8
40	2085 4	367.7	50	2671.8	592.3	60	3308.0	886.4
10	2094.9	371.0	10	2681.9	596.6	10	3319.1	892.0
20	2104.3	374.2	20	2692.1	600.9	20	3330.3	897.5
30	2113.8	377.5	30	2702.3	605.3	30	3341.4	903.2
40	2123.3	380.8	40	2712.5	609.6	40	3352.6	908.8
50	2132.7	384.1	50	2722.7	614.0	50	3363.8	914.5

TABLE VII.—TANGENTS AND EXTERNALS TO A 1° CURVE.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
61°	3375.0	920.2	71°	4086.9	1368.2	81°	4893.6	1805.3
10′	3386.3	925.9	10′	4099.5	1315.6	10′	4908.0	1814.7
20	3397.5	931.6	20	4112.1	1322.9	20	4922.5	1824.1
30	3408.8	937.3	30	4124.8	1330.3	30	4937.0	1833.6
40	3420.1	943.1	40	4137.4	1337.7	40	4951.5	1843.1
50	3431.4	948.9	50	4150.1	1345.1	50	4966.1	1852.6
62	3442.7	954.8	72	4162.8	1352.6	82	4980.7	1862.2
10	3454.1	960.6	10	4175.6	1360.1	10	4995.4	1871.8
20	3465.4	966.5	20	4188.5	1367.6	20	5010.0	1881.5
30	3476.8	972.4	30	4201.2	1375.2	30	5024.8	1891.2
40	3488.3	978.3	40	4214.0	1382.8	40	5039.5	1900.9
50	3499.7	984.3	50	4226.8	1390.4	50	5054.3	1910.7
63	3511.1	990.2	73	4239.7	1398.0	83	5069.2	1920.5
10	3522.6	996.2	10	4252.6	1405.7	10	5084.0	1930.4
20	3534.1	1002.3	20	4265.6	1413.5	20	5099.0	1940.3
30	3545.6	1008.3	30	4278.5	1421.2	30	5113.9	1950.3
40	3557.2	1014.4	40	4291.5	1429.0	40	5128.9	1960.2
50	3568.7	1020.5	50	4304.6	1436.8	50	5143.9	1970.3
64	3580.3	1026.6	74	4317.6	1444.6	84	5159.0	1980.4
10	3591.9	1032.8	10	4330.7	1452.5	10	5174.1	1990.5
20	3603.5	1039.0	20	4343.8	1460.4	20	5189.3	2000.6
30	3615.1	1045.2	30	4356.9	1468.4	30	5204.4	2010.8
40	3626.8	1051.4	40	4370.1	1476.4	40	5219.7	2021.1
50	3638.5	1057.7	50	4383.3	1484.4	50	5234.9	2031.4
65	3650.2	1063.9	75	4396.5	1492.4	85	5250.3	2041.7
10	3661.9	1070.2	10	4409.8	1500.5	10	5265.6	2052.1
20	3673.7	1076.6	20	4423.1	1508.6	20	5281.0	2062.5
30	3685.4	1082.9	30	4436.4	1516.7	30	5296.4	2073.0
40	3697.2	1089.3	40	4449.7	1524.9	40	5311.9	2083.5
50	3709.0	1095.7	50	4463.1	1533.1	50	5327.4	2094.1
66	3720.9	1102.2	76	4476.5	1541.4	86	5343.0	2104.7
10	3732.7	1108.6	10	4489.9	1549.7	10	5358.6	2115.3
20	3744.6	1115.1	20	4503.4	1558.0	20	5374.2	2126.0
30	3756.5	1121.7	30	4516.9	1566.3	30	5389.9	2136.7
40	3768.5	1128.2	40	4536.4	1574.7	40	5405.6	2147.5
50	3780.4	1134.8	50	4544.0	1583.1	50	5421.4	2158.4
67	3792.4	1141.4	77	4557.6	1591.6	87	5437.2	2169.2
10	3804.4	1148.0	10	4571.2	1600.1	10	5453.1	2180.2
20	3816.4	1154.7	20	4584.8	1608.6	20	5469.0	2191.1
30	3828.4	1161.3	30	4598.5	1617.1	30	5484.9	2202.2
40	3840.5	1168.1	40	4612.2	1625.7	40	5500.9	2213.2
50	3852.6	1174.8	50	4626.0	1634.4	50	5517.0	2224.3
68	3864.7	1181.6	78	4639.8	1643.0	88	5533.1	2235.5
10	3876.8	1188.4	10	4653.6	1651.7	10	5549.2	2246.7
20	3889.0	1195.2	20	4667.4	1660.5	20	5565.4	2258.0
30	3901.2	1202.0	30	4681.3	1669.2	30	5581.6	2269.3
40	3913.4	1208.9	40	4695.2	1678.1	40	5597.8	2280.6
50	3925.6	1215.8	50	4709.2	1686.9	50	5614.2	2292.0
69	3937.9	1222.7	79	4723.2	1695.8	89	5630.5	2303.5
10	3950.2	1229.7	10	4737.2	1704.7	10	5646.9	2315.0
20	3962.5	1236.7	20	4751.2	1713.7	20	5663.4	2326.6
30	3974.8	1243.7	30	4765.3	1722.7	30	5679.9	2338.2
40	3987.2	1250.8	40	4779.4	1731.7	40	5696.4	2349.8
50	3999.5	1257.9	50	4793.6	1740.8	50	5713.0	2361.5
70	4011.9	1265.0	80	4807.7	1749.9	90	5729.7	2373.3
10	4024.4	1272.1	10	4822.0	1759.0	10	5746.3	2385.1
20	4036.8	1279.3	20	4836.2	1768.2	20	5763.1	2397.0
30	4049.3	1286.5	30	4850.5	1777.4	30	5779.9	2408.9
40	4061.8	1293.6	40	4864.8	1786.7	40	5796.7	2420.9
50	4074.4	1300.9	50	4879.2	1796.0	50	5813.6	2432.9

TABLE VII.—TANGENTS AND EXTERNALS TO A 1° CURVE.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
91°	5830.5	2444.9	101°	6950.6	3278.1	111°	8336.7	4386.1
10′	5847.5	2457.1	10′	6971.3	3294.1	10′	8362.7	4407.6
20	5864.6	2469.3	20	6992.0	3310.1	20	8388.9	4429.2
30	5881.7	2481.5	30	7012.7	3326.1	30	8415.1	4450.9
40	5898.8	2493.8	40	7033.6	3342.3	40	8441.5	4472.7
50	5916.0	2506.1	50	7054.5	3358.5	50	8468.0	4494.6
92	5933.2	2518.5	102	7075.5	3374.9	112	8494.6	4516.6
10	5950.5	2531.0	10	7096.6	3391.2	10	8521.3	4538.8
20	5967.9	2543.5	20	7117.8	3407.7	20	8548.1	4561.1
30	5985.3	2556.0	30	7139.0	3424.3	30	8575.0	4583.4
40	6002.7	2568.6	40	7160.3	3440.9	40	8602.1	4606.0
50	6020.2	2581.3	50	7181.7	3457.6	50	8629.3	4628.6
93	6037.8	2594.0	103	7203.2	3474.4	113	8656.6	4651.3
10	6055.4	2606.8	10	7224.7	3491.3	10	8684.0	4674.2
20	6073.1	2619.7	20	7246.3	3508.2	20	8711.5	4697.2
30	6090.8	2632.6	30	7268.0	3525.2	30	8739.2	4720.3
40	6108.6	2645.5	40	7289.8	3542.4	40	8767.0	4743.6
50	6126.4	2658.5	50	7311.7	3559.6	50	8794.9	4766.9
94	6144.3	2671.6	104	7333.6	3576.8	114	8822.9	4790.4
10	6162.6	2684.7	10	7355.6	3594.2	10	8851.0	4814.1
20	6180.2	2697.9	20	7377.8	3611.7	20	8879.3	4837.8
30	6198.3	2711.2	30	7399.9	3629.2	30	8907.7	4861.7
40	6216.4	2724.5	40	7422.2	3646.8	40	8936.3	4885.7
50	6234.6	2737.9	50	7444.6	3664.5	50	8965.0	4909.9
95	6252.8	2751.3	105	7467.0	3682.3	115	8993.8	4934.1
10	6271.1	2764.8	10	7489.6	3700.2	10	9022.7	4958.6
20	6289.4	2778.3	20	7512.2	3718.2	20	9051.7	4983.1
30	6307.9	2792.0	30	7534.9	3736.2	30	9080.9	5007.8
40	6326.3	2805.6	40	7557.7	3754.4	40	9110.3	5032.6
50	6344.8	2819.4	50	7580.5	3772.6	50	9139.8	5057.6
96	6363.4	2833.2	106	7603.5	3791.0	116	9169.4	5082.7
10	6382.1	2847.0	10	7626.6	3809.4	10	9199.1	5107.9
20	6400.8	2861.0	20	7649.7	3827.9	20	9229.0	5133.3
30	6419.5	2875.0	30	7672.9	3846.5	30	9259.0	5158.8
40	6438.4	2889.0	40	7696.3	3865.2	40	9289.2	5184.5
50	6457.3	2903.1	50	7719.7	3884.0	50	9319.5	5210.3
97	6476.2	2917.3	107	7743.2	3902.9	117	9349.9	5236.2
10	6495.2	2931.6	10	7766.8	3921.9	10	9380.5	5262.3
20	6514.3	2945.9	20	7790.5	3940.9	20	9411.3	5288.6
30	6533.4	2960.3	30	7814.3	3960.1	30	9442.2	5315.0
40	6552.6	2974.7	40	7838.1	3979.4	40	9473.2	5341.5
50	6571.9	2989.2	50	7862.1	3998.7	50	9504.4	5368.2
98	6591.2	3003.8	108	7886.2	4018.2	118	9535.7	5395.1
10	6610.6	3018.4	10	7910.4	4037.8	10	9567.2	5422.1
20	6630.1	3033.1	20	7934.6	4057.4	20	9598.9	5449.2
30	6649.6	3047.9	30	7959.0	4077.2	30	9630.7	5476.5
40	6669.2	3062.8	40	7983.5	4097.1	40	9662.6	5504.0
50	6688.8	3077.7	50	8008.0	4117.0	50	9694.7	5531.7
99	6708.6	3092.7	109	8032.7	4137.1	119	9727.0	5559.4
10	6728.4	3107.7	10	8057.4	4157.3	10	9759.4	5587.4
20	6748.2	3122.9	20	8082.3	4177.5	20	9792.0	5615.5
30	6768.1	3138.1	30	8107.3	4197.9	30	9824.8	5643.8
40	6788.1	3153.3	40	8132.3	4218.4	40	9857.7	5672.3
50	5808.2	3168.7	50	8157.5	4239.0	50	9890.8	5700.9
100	6828.3	3184.1	110	8182.8	4259.7	120	9924.0	5729.7
10	6848.5	3199.6	10	8208.2	4280.5	10	9957.5	5758.6
20	6868.8	3215.1	20	8233.7	4301.4	20	9991.0	5787.7
30	6889.2	3230.8	30	8259.3	4322.4	30	10025.0	5817.0
40	6909.6	3246.5	40	8285.0	4343.6	40	10059.0	5846.5
50	6930.1	3262.3	50	8310.8	4364.8	50	10093.9	5876.1

0432

TABLE VIII.—MIDDLE ORDINATES FOR RAILS.

Deg. of Curve	LENGTH OF RAILS.							Deg. of Curve	LENGTH OF RAILS.						
	32	30	28	26	24	22	20		32	30	28	26	24	22	20
1°	.022	.020	.016	.013	.011	.009	.008	16°	.356	.313	.273	.236	.200	.170	.139
2	.045	.038	.034	.029	.025	.021	.017	17	.378	.333	.290	.252	.213	.180	.148
3	.037	.058	.051	.044	.037	.031	.026	18	.400	.351	.306	.265	.225	.190	.156
4	.089	.079	.069	.060	050	.042	.035	19	.423	.371	324	.280	.238	.201	.165
5	.112	.099	.086	074	.063	.053	.044	20	.445	.392	341	.296	.250	.212	174
6	.134	.117	.102	088	.076	.064	.052	21	.466	.410	.357	.309	.262	.222	.182
7	.156	.137	.120	.104	.088	.074	.061	22	.487	.430	.375	.325	.275	.233	.191
8	.179	.158	.137	.119	.100	.085	.070	23	.509	.450	.390	338	.287	.243	.199
9	201	.175	.153	.133	.112	.095	.078	24	531	469	.408	.354	.299	.253	.208
10	.223	196	.171	148	.125	.106	.087	25	.552	.486	.424	.367	.311	.263	.216
11	245	216	.188	.163	.139	.117	.096	26	.573	.506	441	.382	.323	.274	.225
12	.268	.236	.206	179	.151	.128	.105	27	.594	.524	.457	.396	.335	.284	.233
13	.290	.254	.222	.192	.163	.138	.113	28	.618	.545	.475	.411	.348	.294	.242
14	312	.275	.239	.207	.175	.148	.122	29	.638	.564	.491	.424	.361	303	.250
15	.334	.295	.257	.223	.188	.159	.131	30	.660	.583	.508	.438	.374	.313	.259

CURVE FORMULÆ.

$$T = R \text{ tan. } \tfrac{1}{2} I$$

$$T = \frac{50 \text{ tan. } \tfrac{1}{2} I}{\text{Sin. } D}$$

$$\text{Sin. } D = \frac{50}{R}$$

$$\text{Sin. } D = \frac{50 \text{ tan. } \tfrac{1}{2} I}{T}$$

$$R = T \text{ cot. } \tfrac{1}{2} I$$

$$R = \frac{50}{\text{Sin. } D}$$

$$E = R \text{ ex. sec. } \tfrac{1}{2} I$$

$$E = T \text{ tan. } \tfrac{1}{4} I$$

$$\text{Chord def.} = \frac{\text{chord}^2}{R}$$

$$\text{No. chords} = \frac{\tfrac{1}{2} I}{D}$$

$$\text{Tan. def.} = \tfrac{1}{2} \text{ chord def.}$$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

Table 7 contains Tangents and Externals to a 1° curve Tan. and Ext. to any other radius may be found, nearly enough, by dividing the Tan. or Ext. opposite the given central angle by the given degree of curve.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and External: Divide Ext. opposite the given Central Angle by the given External.

To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table 7: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.), and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance: Multiply the angle by .01745, and the product by the distance.

RIGHT ANGLE TRIANGLES.—Square the altitude, divide by twice the base. Add quotient to base for hypothenuse.

Given Base 100, Alt. 10. $10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. 25. $25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875 =$ Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

(7-3-06—1M) FORM 3010

SOUTHERN PACIFIC CO.

ENGINEER'S DEPARTMENT

Instructions to Engineers in Charge of Field Parties

1. All Pay-Rolls and Vouchers are to be made out on the first day of each month, on the blanks furnished for that purpose, and forwarded to the Chief Engineer.

Give the Christian name and initial letter of a middle name on Payment Roll and Voucher.

Itemize all Vouchers, giving the date and place of disbursements; and when possible to do so, take receipt for all disbursements.

Time will be computed by calendar months and fractions of the same. A contribution of fifty cents will be expected from all employes (except Chinese) who have worked seven (7) days or more during each month, and twenty-five cents for less than seven (7) days.

2. No time will be allowed men absent on private business. No time will be allowed any of the party, excepting those placed on duty by the Chief of party until the work for which they were engaged shall commence; nor will any time be allowed after the evening of the last day's work, excepting to those detailed as Teamsters, Cooks, or for other duty by the Chief of party or his Agent. Give to men discharged a certificate of the time and amount due them.

3. All men will be returned free to the place at which they were engaged for any particular survey—excepting by agreement to the contrary—unless discharged for disobedience or incompetency, or leaving without the full consent of the Chief of party, in which case traveling expenses will not be allowed. Ten (10) days' notice will be required from all employes, in order to leave the service in good standing, unless the requirement be waived by the Engineer in charge

In case of sickness of any member of party entitled to hospital treatment, the Chief of party must give a Hospital Certificate.

4. Books, Stationery, Instruments and other property of the Company are to be kept in good order; the Chief of the Party will be charged for the same, and he must return them in like order in which they were received, or satisfactorily account for their damage or loss.

5. All requisitions must be sent to the Chief Engineer by letter and the telegraph is not to be used for that purpose, unless writing would occasion delay or loss.

6. Note on first page of every field book a full description of the particular route, line and work to which the notes relate, and enter date of each day's work in the proper place.

7. Note name and address in each Transit Book of all members of the party; and in the Level Book, name and address of Leveler and Rodman.

8. A journal must be kept, fully describing each day's work, and noting all information of interest, and how it was derived.

9. Monthly reports must be sent to the Chief Engineer on the first day of each month, giving the lengths and descriptions of the various lines run, and all work done, with such other information as may come within the knowledge of the Engineer in charge, of which the Chief Engineer should be informed.

WILLIAM HOOD,
CHIEF ENGINEER.

5-14-05-1M

SOUTHERN PACIFI

(PACIFIC SYSTEM.)

Engineering Departm

SECTIONING.

Instructions to Levelle

1.—Instruments will be kept in adjustment, but depende accurate work will be on equal back and foresights, where cable to take them, or where taken of unequal lengths, it m compensated for in subsequent sights.

2.—No sights on turning points are to be more than feet long, and must be shorter where heat in the air, or cause, makes results of long sights inaccurate.

3.—Leveller must read all sights on turning points himse tenths, through the instrument or otherwise, trusting to the man only for the hundredths and thousandths of the reading.

4.—Rodman will keep a check note-book of turning points.

5.—Leveller will check up his turning-point computations by differences of back and foresight sums, and not depend on the rodman's check notes.

6.—Intermediate elevations must be checked by difference of elevations and of rod readings before being platted on profiles.

7.—Rod must be swung back and forth on all backsights and foresights on turning points, to insure getting the shortest possible reading.

8.—Transverse slopes must always be taken at each station of survey, and as much oftener as country requires.

9.—Take high water elevations frequently, of all water-courses large or small, search carefully for drift marks, and get all available information from old residents.

10.—On both preliminary and final surveys, when the line is in the valley of a water-course, large or small, with grade nearly parallel to the flood mark, the leveller will note elevation of water surface (or bottom of water-course, if dry) at least once each quarter of a mile, and as much oftener as may be necessary to completely show the grade changes of the water course. The results will be platted on all profiles, a dash (—) dra proper elevation being used to indicate the water surfa of water-course, and the usual dotted line being reserve cated flood marks.

11.—Put in Bench Marks at least every half mile in val every one thousand feet in hilly regions. Mark all benc the letter of the line and the elevation.

12.—Bench Marks must be turning points and not pu intermediate sights. Their location must be fully describ field book.

13.—When connecting with another line, make full note difference of elevations, and how much higher elevation of is, by one set of levels than by the other.

14.—All level books must be paged and fully indexed.

0434